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The Hydrologic
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GENERALIZED COMPUTER PROGRAM

Hydraulics

Graphics

Package

Users Manual

November 1985

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HGP

HYDRAULICS GRAPHICS PACKAGE

Users Manual

November, 1985

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Chapter 1

Introduction

1.1 Overview of Program Capabilities

The Hydraulics Graphis Package (HGP) is a generalized graphics program designed to display geometric and mathematical results pertinent to hydraulic analysis. The package consists of two programs. One is the cross-section (HGPC) program and the other is the profile (HGPP) program. The HGP can be executed interactively or batch to produce graphics on a TEKTRONIX 4014 CRT or CALCOMP drum plotter. The HGP is presently capable of displaying input and output data from three hydraulic programs and output results from a fourth. The following is a list of these hydraulic programs.

1. HEC-2 (Water Surface Profiles).
2. GEDA (Geometric Elements from Cross-Section Coordinates).
3. HEC-6 (Scour and Deposition in Rivers and Reservoirs).
4. DAMPOS (N.W.S. DAM-BREAK Flood Forecasting Model Post Processor).

For additional information and examples in using the above programs, see Appendices II through V.

1.2 Program Development

The HGP computer program was developed in the Hydrologic Engineering Center by Robert D. Carl and Alfredo E. Montalvo. The version documented herein, dated June 1983, is intended to replace all earlier versions. The basic capabilities and input commands have not been altered significantly from the old version of the program. However, certain commands have been eliminated, new ones added and others renamed to make them more consistent and meaningful. The HGP has been updated to be fully compatible with the new HEC-2 capabilities dealing with flow under ice option, split flow, rating curve, and expanded channel improvement options.

The HGP has also been given the new capabilities of plotting HEC-6 input histograms and plotting output results from DAMPOS, HEC's post-processor program for the National Weather Service's (N.W.S.) Dam-Break (DAMBRK) program.

1.3 Hydraulics Graphics Package Cross-Section (HGPC) Program

The HGPC program has the capability of displaying hydraulic input data and output results that have been saved from a previous execution of a hydraulics program. HGPC draws geometric cross-section data and includes the capability of displaying ground surface lines, channel restrictions (such as bridges, sediment levels, levees, and encroachments), channel modifications (such as the result of cut and fill operations), and parametric data pertinent to a computer model (such as bank stations, rating curves, split flows, dredge bed limits, moveable bed limits, and histograms). If both input and output data are to be plotted, HGPC will plot water surface lines on the cross-section plots. If only output results are to be plotted, HGPC will provide variable vs variable plots at each cross-section. The program has the capability of displaying up to 15 curves simultaneously.

1.4 Hydraulics Graphics Package Profile (HGPP) Program

The HGPP program displays hydraulic output results of user defined variables vs cummulative river distance. The program displays, in profile view, data such as left and right bank elevations, minimum cross-section elevations, conveyances, velocities, water surface elevations, critical elevations, and energy grade line elevations. The program is capable of displaying up to 46 curves simultaneously.

Chapter 2

Software and Hardware Requirements

2.1 Software

The HGP program is written in FORTRAN and requires two graphics language libraries for loading. The program utilizes the United States Military Academy (USMA) Graphics Compatability System (GCS) and the California Computer Products, Inc. (CALCOMP) graphics software. Neither of the graphics software libraries are provided by the HEC and must be obtained independently from the HGP program. The GCS software can be obtained from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The CALCOMP software can be obtained from California Computer Products Inc.

2.2 Hardware

The HGP requires that certain graphics equipment be used. The graphics equipment needed is a TEKTRONIX 4014 CRT and a CALCOMP drum plotter or equipment that is compatible with the GCS and CALCOMP software. The program has been loaded on a HARRIS 500 computer and on CDC computers.

The following table of approximate memory requirements and compilation times for the HARRIS 500 is provided as an example of the computer requirements needed to load the program.

TABLE 1
Computer Memory and Time Requirements

COMPUTER	Memory Requirements 3-Byte Words (Octal) HGPP	HGPC	Compile Time Min:Sec HGPP	HGPC
HARRIS 500	177467	177637	3:41	4:40

2.3 Machine Dependency

The HGP program is machine-dependent and may require substantial conversion resources for various machines, depending on the computer being used. Care has been taken to centralize the machine-dependent statements and to introduce internal variables that enhance the conversion process. Currently, the program is operational on HARRIS 500 and CDC Cybernet computers. No testing has been attempted on any other machine. Thus, attempts to perform such a task may involve problems not discussed here.

The prime machine dependency involves alphanumeric processing. All user input is processed by "ENCODE/DECODE" statements. These statements are located in subroutines WRCODE, WRCOD2, and RDCOD2. The variable "XCODE" controls branches in these subroutines. If "XCODE" equals one, program flow goes through the "ENCODE/DECODE" statements. If "XCODE" equals two, program flow goes through formatted write/read statements on a scratch disk. If the computer software has an alternative to "ENCODE/DECODE", the programmer may write a corresponding section of FORTRAN code to replace the "ENCODE/DECODE" sections.

Associated with this alphanumeric processing is the number of characters per word. The package's internal variable "KALPFL" tells the program the number of characters per word. If the user's machine's characters per word are different than the "KALPFL" default setting, the programmer must change this variable prior to program compilation. This change also means that all FORTRAN format statements using the alpha conversion format must be converted to a compatible structure.

2.4 Use of Disk Files

The HGP program is composed of two programs. Each program requires certain disk files during execution. The following is a list of the disk units that must be assigned when using the HGPC and HGPP Programs.

Disk Unit Number	Use
5	Assigned to the interactive terminal or to input device. User specified options are read from this unit number.
6	Output unit number. Informational print-out and trace information are written to this unit number.
2	The standard hydraulic input data file must be assigned this unit number. An empty file must be assigned this unit number if the variable vs. variable option is being used. Used only with HGPC Program.
95	The binary output file produced by a hydraulic program must be assigned this unit number. May be an empty file if HGPC is being used. Must be a valid file if HGPP is being used.
1	Scratch Disk file unit number.
4	Scratch Disk file unit number.
33	Scratch Disk file unit number.

Disk Unit Number	Use
66,77	Scratch Disk unit numbers used by GCS software.
99	CALCOMP plotting output is written to this unit number. It must be disposed to the plotter in some fashion.

Depending on the computer being used, all of the above unit numbers may not be necessary or they may be different. For example, the HARRIS 500 user does not assign the GCS and PREAD unit numbers; the GCS and PREAD software assigns them. The PREAD software is only available to HARRIS 500 users and is discussed in Appendix VII.

Chapter 3

HGP Free Format User Input

3.1 Command Language Syntax

The HGP program uses a free format input mode for entering user commands. A comma is the only legitimate delimiter allowed and cannot be used in alphanumeric labels unless enclosed in quotation marks. When commands are entered, only the first four characters are significant because the free format reader only uses the first four characters read and ignores the rest. Exceptions are commands less than four characters long. More than one command may be entered per line of input delimited by commas. An exception is a command that invokes automatic, repetitive input sequences.

3.2 Command Types

The HGP program has three types of commands. The first type specifies an option or setting. For example, the command "BATCH" specifies that the program is operating in the batch environment. The second type of command is used to activate an automatic repetitive input sequence where the program requests specific command settings from the user. An example is the "DEFINE" command which turns on a repetitive input sequence that is used to define or set the plotting curve parameters. The third type of command has a value associated with it and consists of at least two parts. The first part is the command or variable name (four characters minimum) and the second part, delimited by a comma, its value or setting. An example would be the command "SPEED,480", which is used to specify the terminal's rate of communication. In this example a communication rate of 480 CPS is set.

The number of commands available to the user is large, because of the large number of graphics options. The available user defined options allow the user to specify the size of the plot, scaling, graph labels, plot grid, symbol and line types, lettering sizes, variables to plot, print-out level, trace options, and plot destination. Many options apply to both the HGPC and the HGPP programs, whereas others are specific to the program being used. A detailed description of the commands are presented in Appendix I.

Appendix I

HGP COMMANDS

APPENDIX I
HGP COMMANDS

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APPENDIX I
HGP COMMANDS

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1. Global Commands

The following commands apply to both the HGPC and HGPP programs.

a. The user can obtain information helpful for specifying options by entering question marks or the "STAT" command. The amount and type of output is controlled by the number of question marks entered.

Command	Description
?	Lists all valid commands.
??	Lists all valid commands and their current settings.
???	Current command, its value, and a definition of the command.
????	Lists all valid commands, their current settings, and a definition of each command.
STAT	Lists the commands and curve parameter settings.

NOTE: See Appendix VII for examples using the above commands.

b. SPEC — The "SPEC" command is used to request that the user-specified input routine be activated.

c. There are several commands that allow the user to exit or terminate a specific function or stop the program. These commands are:

Command	Description
ALL	Causes exit from repetitive input sequences initiated by the commands: "SCALE", "DEFI" and "SECP".
GO	Exits from the user specified input routine and commences plotting. When finished plotting, the program returns to the standard user input routine.
FINISH	Exits from current processing, creates graphs if in batch mode, and terminates the execution.
STOP	Terminates the execution of the graphics program.

d. The following commands deal with the operational environment that the HGP is being executed under.

Command	Description
INTERACTIVE	Specifies that the program is being executed in an interactive environment requiring pauses between graphs for possible user interactions. Default setting.
BATCH	Specifies that the program is being executed in a batch environment and no pauses will be used between plots.

e. The HGP program is capable of generating plots for both the TEKTRONIX 4014 and CALCOMP drum plotter. The following commands are used to specify the graphics software being used.

Command	Description
GCS	Specifies that the Graphics Compatability System (GCS) software is being used. Default setting.
CALCOMP	Specifies that CALCOMP software is being used.
TEKTRONIX	Non-operable at the present time. For future use to allow PLOT10 software.

f. The following is a list of the commands dealing with specifying the graphics device being used, when using GCS software.

Command	Description
TK4	TEKTRONIX 4014 graphics device being used. Default setting.
C93	CALCOMP drum plotter being used.
PLHT,value	Specifies the width of the CALCOMP drum plotter in inches. Default value is 30 inches.
SPEED,value	Specifies the terminal's communication rate in characters per second (CPS). Default value is 480 CPS.
DESTINATION, value	Indicates the destination of the plot. It is used to access certain CALCOMP site specific commands. Currently, option has two values: "BKY" and "REMOTE". Default value is "REMOTE". The BKY option uses certain Lawrence Berkeley Laboratory site specific commands.

g. The following commands are used to specify the level of print-out by the program.

Command	Description
PRNT,value	Gives output of internal program information including plotting option and echoes user input commands. The default is a value of 0. A value of 30 is reasonable.
TRACE,value	Provides a trace of the program execution. The default is 0. A value of 100 would give moderate trace. This option should only be used for tracing errors in the program.

h. The HGP has several commands that allow the user to input labels that will appear on the plots.

Command	Description
GLBL,label	A user defined general alphanumeric graph label. Default is no label.
SLOC,label	A second defined alphanumeric graph label.
XLBL,label	The x-axis alphanumeric label. Default labels: HGPC - "STATION (FEET)" HGPP - "RIVER DISTANCE (FEET)"
YLBL,label	The y-axis alphanumeric graph label. Default labels: GCS - "ELEVATION" CALCOMP - "ELEVATION (FEET ABOVE MSL)"

NOTE: Different default labels are used if rating curves or histograms are being plotted. If no user defined X and Y axis labels are used, the program will use appropriate labels for time and discharge axis.

i. The user has four commands available that control the detail of labels and grid that are to be output.

Command	Description
TITLBL,value	Controls the detail of labels to be plotted. The following are the possible settings.

Value	Description
0	Only axis labels are plotted.
1	General labels "GLBL" and "SLOC" are output.
2	All labels are output including a legend block identifying the different curves (default).

Command	Description
XLAB,value YLAB,value	Applies only to GCS. Controls axis labels.

Value	Description
1	Numeric labels only.
2	Alphanumeric labels only.
3	Both numeric and alphanumeric labels.
4	No axis labels.

AXES,value — Applies only to GCS. Controls plotting of graphs grid. CALCOMP users should use grid plotting paper.

Value	Description
1	Plain axis grid.
2	Tick axis grid (default).
3	Grid axis.

j. The size of the plot is controlled by the following commands.

Command	Description
GXMIN,value	This command sets the minimum x-axis value in inches.
GXMAX,value	This command sets the maximum x-axis value in inches.
GYMIN,value	This command sets the minimum y-axis value in inches.
GYMAX,value	This command sets the maximum y-axis value in inches.

For GCS, the graph size includes the plot, as well as labels outside of the plot display area. Thus, the actual axis length is smaller than the difference between the maximum and minimum values. However, CALCOMP generated plots utilize the coordinate (GXMIN,GYMIN) to locate the intersection of axes (the origin) and variables GXMAX and GYMAX to define the maximum extent of the axes. Thus, the axis length is exactly equal to the difference between the maximum and the minimum absolute coordinates. Default values are:

	HGPP		HGPC	
	GCS	CALCOMP	GCS	CALCOMP
GXMIN	0.0	2.0	0.0	1.0
GXMAX	13.5	15.0	10.5	11.0
GYMIN	0.0	15.0	10.5	11.0
GYMIN	0.0	1.0	0.0	1.0
GYMAX	10.5	10.0	10.5	8.0

An entire CALCOMP plot can be enlarged or reduced in size by the use of the following command.

Command	Description
FACTOR,value	This command is used for CALCOMP plots to reduce or enlarge them by a factor. Default value is 1.

k. There are several ways to enter scaling specifications. Commands used to control the number of divisions and the vertical units per division are as follows:

Command	Description
DIVX,value	Used to specify the number of divisions for the x-axis. Default setting: DIVX=/GXMAX-GXMIN/
DIVY,value	Used to specify the number of divisions for the y-axis. Default setting: DIVY=/GYMAX-GYMIN/
XAUPI,value	Used to specify the number of virtual units per division for the x-axis. Will be applied to all plots.
YAUPI,value	Used to specify the number of vertical units per division for the y-axis. Will be applied to all plots.

The default setting is 0.0 for XAUPI and YAUPI. This means that the program will examine the data to determine the maximum and minimum data values, and then will determine an appropriate scale to use for the plot. For additional ways of scaling the plots, see command "SCALE" in Sections and 3.

l. The following commands deal with setting the letter sizes.

Command	Description
HLGLB,value	Letter size of general graph label "GLBL"
HLSLOC,value	Letter size of second general label "SLOC"
HLLEGD,value	Letter size of legend curve label "VARDES"
HLSEC,value	Letter size of the section number label.
HLXLB,value	Letter size of x-axis label "XLBL". Only operable for GCS.
HLXNUM,value	Not operable at present time.
HLYNUM,value	Not operable at present time.

The default setting for the letter size is as follows:

	HGPP		HGPC	
	GCS	CALCOMP	GCS	CALCOMP
Size	1	.1	1	.1

2. HGPC Specific Commands.

The following commands are specific to the cross-section/variable vs. variable program HGPC.

a. The following commands are used to specify which section numbers to plot.

Command	Description
SECT,value	Command used to enter individual section numbers that the user wishes to plot.
SECP	Command to activate a repetitive input sequence to specify the section numbers that the user wishes to plot. The "ALL" command terminates the input sequence.
STAB,value	First section number in a string of consecutive section numbers to plot. Default setting of -999999.
STAE,value	Last section number in a string of consecutive section numbers beginning with "STAB" to plot. Default setting of 999999.
PLBR,value	Command used to limit the sections plotted to only bridge and ineffective area option sections.

Value	Description
0	Plot all sections (default).
1	Plot bridge sections only.
2	Plot bridge and ineffective area option sections only.

b. The HGP program allows the user the capability of scaling individual cross-sections by the use of the following commands.

Command	Description
SCALE	This command activates a repetitive input sequence in which the user specifies scaling information for specific cross-section numbers. The "ALL" command terminates the input sequence.
SSEC,value	Used to specify the section number that the following scaling commands apply.
XMIN,value	The data's x-axis origin in data units.
XMAX,value	The data's x-axis maximum coordinate in data units.
XPI,value	The data's x-axis scale in data units per division.

Command	Description
YMIN,value	The data's y-axis origin in data units.
YMAX,value	The data's y-axis maximum coordinate in data units.
YPI,value	The data's y-axis scale in data units per division.

c. Several commands exist for specifying curve number, data variables, symbol, line type, symbol size, and curve label. The user has the option of setting any option by the use of individual commands or by activating a repetitive input sequence in which the program prompts the user for the curve settings.

Command	Description
DEFINE	Initiates repetitive input sequence to specify "CURVE", "XVAR", "YVAR", "SYMBOL", "FLINE", "CHSIZE", and "VARDES". The "ALL" command must be entered to terminate the input sequence.
CURVE,value	Identifies curve in which subsequent commands apply. Default setting is 1. Valid values range between 1 and 15.
XVAR,value	Variable number from TAPE95 output file to use on the x-axis. Only used when plotting variable vs. variable.
YVAR,value	Variable number from TAPE95 output file to use on the y-axis. Only used when plotting variable vs. variable.

NOTE: Each of the four different hydraulics programs that the HGP accepts TAPE95 output from have their own unique variable numbers. See Appendices II through V for a listing of the available variable numbers and their definitions.

SYMBOL,value	Allows the user to specify the symbol to be plotted at each data point. Default is no symbol.
FLINE,value	Allows the user to specify the line type to connect virtual data points. Default settings are solid line and variable dashed lines.

NOTE: For "SYMBOL" and "FLINE" values, see Section 4 for additional information.

CHSIZE,value	The size, in inches, of the plotting character or symbol. GCS will accept an integer from 1 through 4 to indicate the hardware size. Default setting is character size 1 for GCS and .07 inches for CALCOMP.

	Command	Description
	VARDES,label	Curve description used in the legend block. Default is based on hydraulics program being used. When using the variable vs. variable option, the user must set "VARDES" for each curve that is defined.
d.	ELBASE,value	This command is used to raise or lower all y-axis data values. Default is 0.
e.	OUTFRM,value	This command controls the plotting of water surface lines for cross-section plots.

Value	Description
WS	Water surface lines will be plotted (default).
NOWS	No water surface lines will be plotted.

f.	BRIDGE,value	This command is used to turn on or off the plotting of HEC-2 BT card data.

Value	Description
0	No
1	Yes (default)

g.	HLCOM,value	Command used to set the comment card label letter size. Default is .1 inches for CALCOMP and character size 1 for GCS.

h. The following commands allow the user to set the field index number that is used to read data on HEC-2's encroachment (ET) and channel improvement (CI) cards and HEC-6's histogram (Q) cards.

Command	Description
INQ,value	Command used to set the field index number used in reading the HEC-2 ET card data. Default is set to value read on first HEC-2 J1 card.
IBW,value	Command used to set the field index number used in reading the HEC-2 CI card data. Default is set to 6 or value read on first HEC-2 J2 card.
IHNQ,value	Command used to set the field index number used in reading the HEC-6 histogram Q cards. Default is set to 1.

3. HGPP Specific Commands

The following commands are specific to the profile/variable vs. river distance program HGPP.

a. The following commands allow the user to modify the plotting data.

Command	Description
STRT,value	This command allows the user to specify the starting cumulative river distance that the first section number will be assigned. Default value is 0.
ELBASE,value	This command is used to raise or lower all y-axis data values. Default is 0.
XUNIT,value	Sets the desired x-axis data units. If a numeric value is entered, all the x-data points are divided by the input value.

Value	Description
FT	Units in feet (default)
MI	Units in miles
KM	Units in kilometers

YUNIT,value	Sets the desired y-axis data units. This is defined similar to the "XUNIT" command.

b. The following comments are used to set options dealing with level of plotting to be done in labeling bridges and section numbers.

Command	Description
BRIDGE,value	This command is used to set the option of plotting bridge symbols.

Value	Description
0	No (default)
1	Yes

XLENBR,value	Used to specify a distance greater than that between two downstream sections of all normal bridges but less than the width between upstream and downstream bridge sections. Default is 2.1 feet.

Command	Description

SECNUM,value — This command sets the option of plotting cross-section location labels.

Value	Description
0	Provide no cross-section number label.
1	Label section location with arrow only.
2	Label with arrow and section number (default).

LABEL — The label command allows the user to define bridge symbols and labels when performing CALCOMP plots. Three types of labels can be defined. The LABEL command starts a repetitive input sequence which prompts the user for the label settings. The prompts continue until the ALL command is entered (see example on page 45). The prompt is:

TYPE, X-VALUE, Y-VALUE, ANGLE/Y2-VALUE, SIZE, LABEL, SYMBOL, ICODE, PEN

where:

Type	Description
1	A bridge symbol will be produced as a label.
2	An alphanumeric label will be produced.
3	Pen movements are to be exectued and specified CALCOMP symbols produced. See Figure 1 (page I-17) for the CALCOMP symbols available.

X-VALUE — the x-axis coordinate value where the label will be located.

Y-VALUE — for Type 1 the y-axis coordinate value for the top of the bridge symbol. For Types 2 and 3, it is used to specify the y-axis coordinate value where the label will be located.

ANGLE/Y2-VALUE — for Type 1 the y-axis coordinate of the low-cord of the bridge symbol. For Types 2 and 3 it is used to specify the angle that the label will be plotted. An angle of 0 would place the label parallel to the x-axis.

Type	Description
SIZE	for Type 1 the width of the bridge symbol in inches. For Types 2 and 3 it is used to specify the height of characters or symbols to be plotted.
LABEL	the alphanumeric string, up to 80 characters, to be plotted for Type 2.
SYMBOL	The integer value designating the symbol to be plotted for Type 3.
ICODE	the status of the pen during the move for Type 3. A -1 indicates the pen being up and a -2 indicates the pen being down.
PEN	the pen number used by the plotter for plotting labels. The pen number is constant for all labels until it is reset.

c. The HGP program allows the user the capability of breaking up the profile plot into multiple plotting windows by the use of the following commands.

Command	Description
SCALE	This command activates a repetitive input sequence in which the user specifies scaling information for specific plot windows. The "ALL" command terminates the input sequence. The plot window number "IWIN" must always be greater than 1. Plot window number 1 is reserved for a plot of the entire profile.
IWINDO,value	Used to specify the plot window number that the following scaling or window commands apply. The user must use integer values greater than 1.
XMIN,value	The data's x-axis origin in data units.
XMAX,value	The data's x-axis maximum coordinate in data units.
XPI,value	The data's x-axis scale in data units per division.
YMIN,value	The data's y-axis origin in data units.
YMAX,value	The data's y-axis maximum coordinate in data units.
YPI,value	The data's y-axis scale in data units per division.
FRSTP,value	Used to indicate the first desired plot window. Default is 1 when only one plot window is available. A value of 2 is default if the "SCALE" command has been used.

d. Several commands exist for specifying the curve number, y-axis data variable number, symbol, line type, symbol size, and curve label. The user has the option of setting options by the use of individual commands or by activating a repetitive input sequence in which the program prompts the user for the settings.

Command	Description
DEFINE	Initiates repetitive input sequence to specify "CURVE", "YVAR", "PRO", "SYMBOL", "FLINE", "CHSIZE", and "VARDES". The "ALL" command must be entered to terminate the input sequence.
CURVE,value	Identifies curve to which subsequent commands apply. Default setting is 1. Valid values range between 1 and 46.
YVAR,value	Variable number from TAPE95 output file to use on the y-axis. Default setting is for streambed profile (Curve 1) and water surface profile for all other curves.
PRO,value	Command used to set the profile number to plot for a specific curve. A value of 0 means that all available profiles for "YVAR" will be plotted.

NOTE: Each of the four different hydraulics programs that the HGP accepts TAPE95 output from have their own unique variable numbers. See Appendices II through V for a listing of the available variable numbers and their definitions.

SYMBOL,value	Allows the user to specify the symbol to be plotted at each data point. Default is no symbol.
FLINE,value	Allows the user to specify the line type to connect virtual data points. Default settings are solid line and variable dashed lines.

NOTE: For "SYMBOL" and "FLINE" values, see Section 4 for additional information.

CHSIZE,value	The size, in inches, of the plotting character or symbol. GCS will accept an integer from 1 thru 4 to indicate the hardware size. Default setting is character size 1 for GCS and .07 inches for CALCOMP.
VARDES,value	Curve description used in the legend block. Default is based on the HEC-2 hydraulics program. When using the variable vs. variable option, the user must set "VARDES" for each curve he defines.

4. HGP Symbol and Line Types

The HGP allows the user to have complete control over the line and symbols being used for each curve. Each curve being plotted has a default line and symbol definition. The user may override the default by activating the "DEFINE" command or by using the "CURVE", "FLINE", and SYMBOL" commands. The user must indicate to which curve the current specification applies before that specification is entered. Values entered take several forms.

a. Symbol options are specified by the use of the "SYMBOL,value" command. This allows the user to specify the symbol to be plotted at each data point for each individual curve. It may have the following forms:

Value	Description
NULL	No symbol (default).
POINT	Only a point is plotted.
ARROW	Arrow terminator (GCS only).
BACKARROW	Arrow at beginning of line segment pointing backwards (GCS only).
DOUBLEARROW	Arrow at each end of a line segment (GCS only).
CHARACTER	A default character will be plotted.
SYMBOL	A default symbol will be plotted.
COORDINATES	The data coordinates will be plotted next to data point (GCS only).
C(CHARACTER)	Indicates the desired character to be used. An example is: "C*" which would plot the character "*" at each data point.
S(NUMBER)	Indicates the desired symbol to be used. The symbol is specified by an integer 0 thru 127. An example is: "S12" which would plot an hour glass at each data point. See Figure 1 for an example listing of possible options (CALCOMP only).

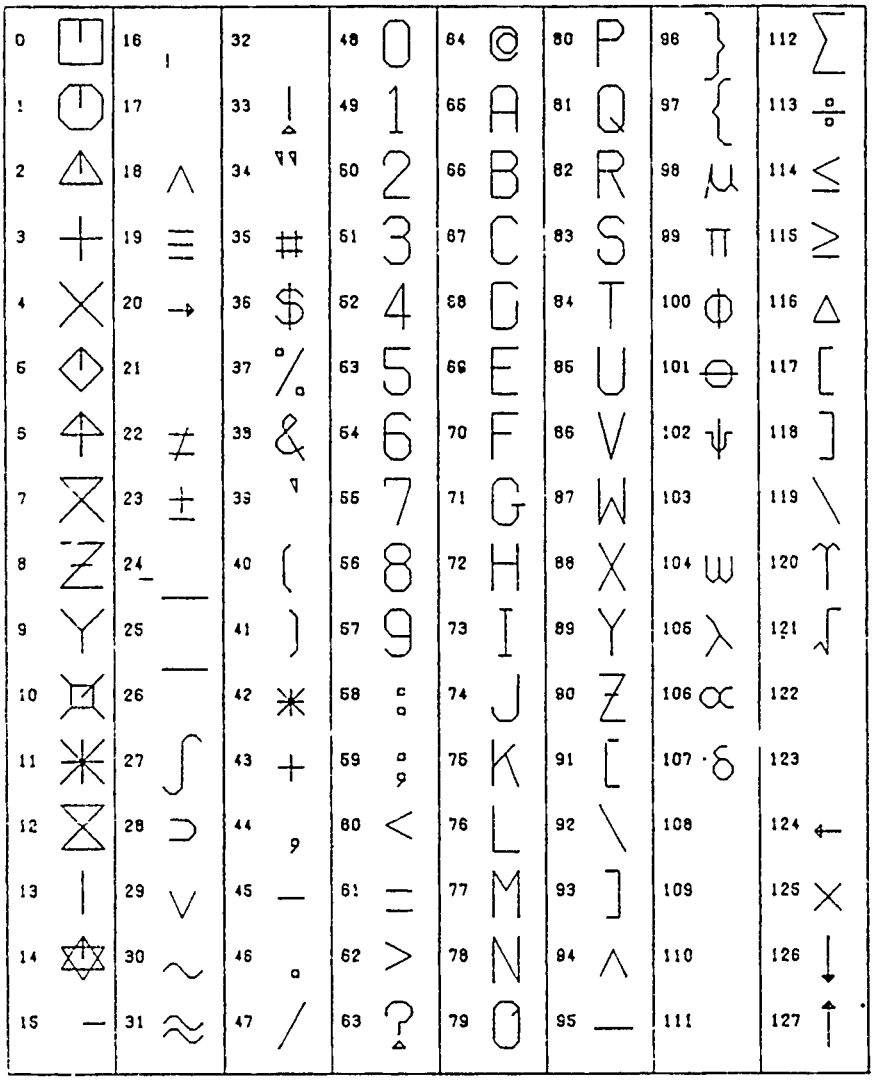
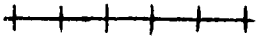


FIGURE 1

ASCII CHARACTERS AVAILABLE WITH THE SYMBOL ROUTINE

b. Line options are specified by the use of the "FLINE,value" command. This allows the user to specify the line type to be used with each curve. It may have the following forms:

Value	Description
NULL	No line is plotted.
LINE	A solid line connects each virtual data point.
DASHED	A default dash line connects points.
TICKED	A default tick line connects data points. The appearance of a ticked line is: 
D(NUMBER)	Specifies a dash line including the line segments within that line.

Dash lines consist of visible and invisible line segments. The length of a particular line segment is indicated by a single integer value. If that integer is odd, the line segment will be visible. If that integer is an even number, the line segment will be invisible. By stringing together two or more digits, a line of multiple segments can be generated. The first line segment corresponds with the left-most digit. Segment processing proceeds from left to right until the last digit is processed whereupon it returns to the left most digit. Below are listed the available integers and the corresponding line lengths (in inches):

INTEGER	LENGTH (INCHES)
1 or 2	0.0366
3 or 4	0.0733
5 or 6	0.1831
7 or 8	0.3662

Three examples of a dash line specification are:

"D7212" which creates the following line: 0.3662 inches visible, 0.0366 inches invisible, 0.0366 inches visible, 0.0366 inches invisible, and then back to 0.3662 inches visible, etc.

"D77" would create a solid line consisting of 0.3662 inch segments.

"D772" would create a line that is: 0.7324 inches visible, .0366 inches invisible and then back to 0.7324 inches visible, etc.

The TEKTRONIX 4014 terminal has the option of hardware generated dashed lines if the terminal has the enhanced graphics board. Digits 1-8 will produce up to 8 different dashed lines depending on the capability of the hardware. The digit 9 will produce a hardware-dotted line.

Value	Description
T(NUMBER)	Specifies a ticked line including the dimension of the "ticks" in hundredths of inches.

Ticked lines consist of solid lines connecting all data points with perpendicular segements extending away from these connecting lines. Pictorally, a tick line may look like this:

Entering the tick line specification includes entering "T" for tick line, followed by the ticplus, ticminus, and ticinterval distances in hundredths-of-inches, entered as a three digit code for each. If a distance of zero is entered for ticplus or ticminus, no segment will appear. Two examples appear below:

"T000010025" - indicates a ticked line with no ticplus line segment, a ticminus line segment of 0.1 inch, and a separation (ticinterval) between tic segments of 0.25 inch.

"T025025025" - indicates 0.25 inch ticked line segments and separation between segments.

NOTE: The tick option is only available to CALCOMP users.

5. HGP - Interactive Cross Hair Options.

The option is initiated by the use of the cross hairs. By entering a character from the keyboard, the character and the cross hair location are sent to the program. When a CALCOMP Plotter is used, no cross hairs are available; therefore, no options are available to the CALCOMP user. The following is a list of options and their respective character entries.

a. Windowing based on TEKTRONIX 4014 cross hairs.

Character	Description
W	Window based on the location of the cross hairs. There are three methods of windowing the plotted data. Each method requires two windowing locations be provided. After the first location is entered, the cross hairs appear for a second time so that the user may specify the second location of the window. When the 'W' is entered for the second set of cross hairs, the data within the window specified is plotted. The actual plot window is adjusted to provide a neat, even tick interval. The three methods for windowing are described below. Window based on a rectangular window by moving the cross hairs vertically and horizontally to define the maximum and minimum X- and Y- axis values (Figures 2 & 3). Window based on Y-axis only by moving the cross hairs vertically and defining the maximum and minimum Y-axis values (Figure 3&4). Window based on X-axis only by moving the cross hairs horizontally and defining the maximum and minimum X-axis values (Figures 4 & 5).
V	Used in conjunction with the window option to draw a rectangle showing the user the window and to set the plot range based on the absolute values set by the cross hairs. When this option is used, the cross hairs are provided again so that the user can redefine the window. If a 'W' is entered, the windowing procedure is repeated so that the window can be adjusted. If any other character is entered for the third set of cross hairs, the program proceeds to plot the data within the window.

b. S (stop) and G (go) cross hair options.

Character	Description
S	If an S is entered for the first cross hairs, the program will be terminated.
G	If a G is entered for the first cross hairs, the program will proceed to the next plot without additional user input needed.

c. Manual Window

If the user enters any other character besides the ones mentioned above, the program will request for the user to enter windowing parameters. By entering a carriage return, the program proceeds to the next plot.

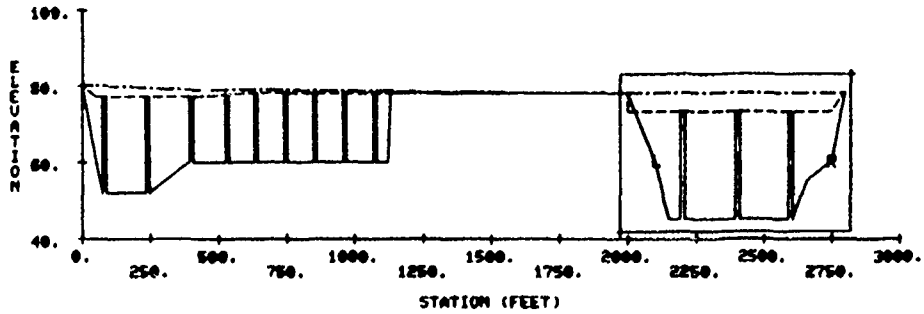


FIGURE 2

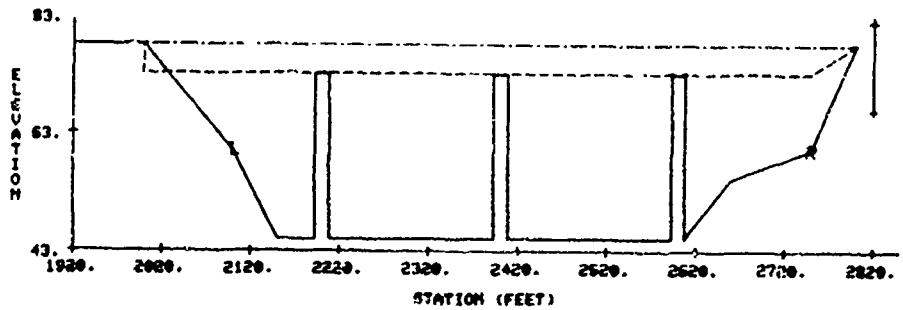


FIGURE 3

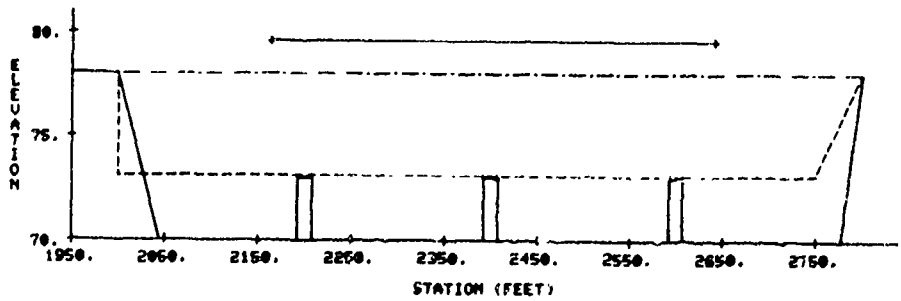


FIGURE 4

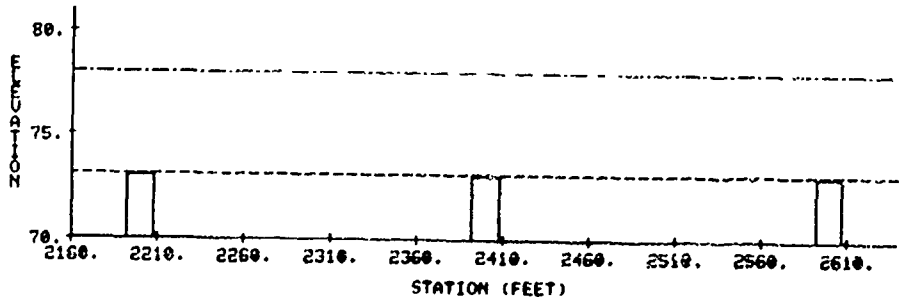


FIGURE 5

Appendix II

HGP HEC-2 EXAMPLES

APPENDIX II

HGP HEC-2 EXAMPLES

Table of Contents

HGP HEC-2 Water Surface Profile Program Examples

1. Introduction

The following examples using the HGP program are based on input and output data from the HEC-2 Water Surface Profile program. The examples given are designed to help the user understand the use of the HGP commands as they apply to the different options, when using HEC-2 data.

Each hydraulics program generates its own unique list of TAPE95 output variables. To identify which variable to use from TAPE95, the user specifies a variable number to the HGP. A table of variable numbers and their descriptions is given in Section 4.

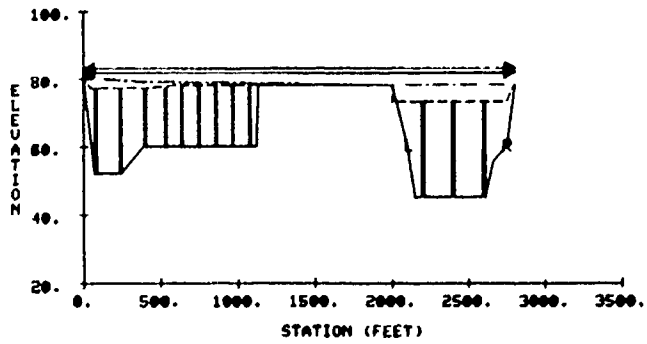
The following examples were run interactively on a HARRIS 500 computer using a TEKTRONIX 4014 terminal and a macro called HGP to assign the files. The macro is listed in Section 5.

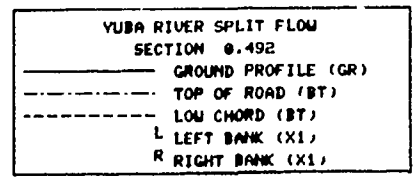
2. Example Plots Using the Cross Section Plotting Program (XSECPL).

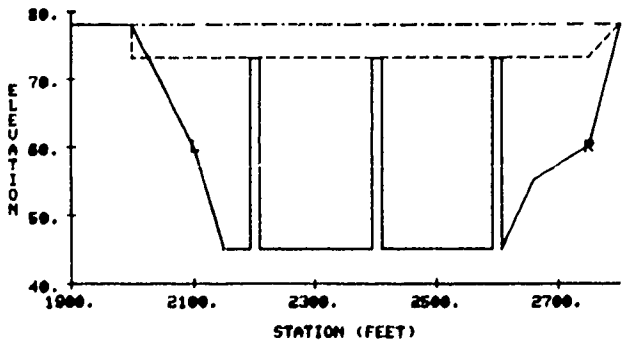
```
HGP              (Macro Command)
 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
X
    ***** CROSS SECTION PLOTTING MODULE *****
 ENTER  HEC2/HEC6/GEDA  INPUT FILE NAME ???
TEST16
 ENTER  TAPE95  FILE NAME ???
 ENTER  NO  IF NONE IS TO BE USED
T1695
```

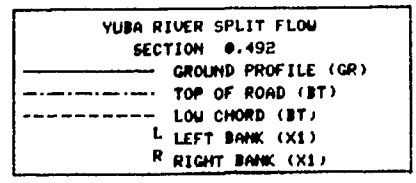
2.a Example of HEC-2 Cross Section Input Plots with Water Surface Lines (Tape 95).

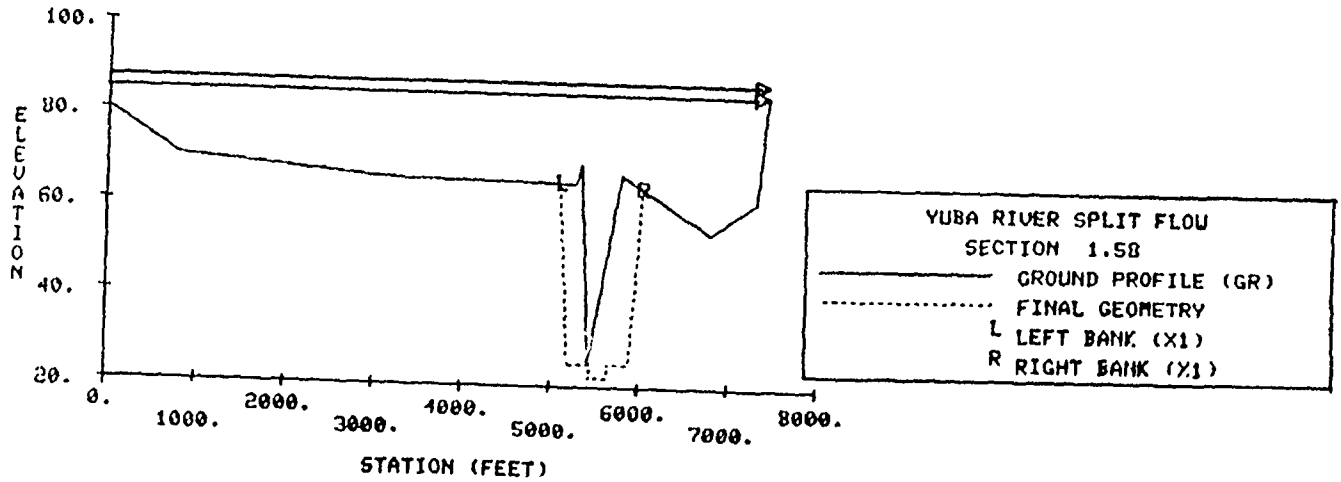
```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*CROSS-SECTION PLOTTING PROGRAM         *
*VERSION 1       JUNE   2, 1983         *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
 WINDOW (XMIN, XPI, XMAX, YMIN, YPI, YMAX) OR(SECT. NUM)
   1900,,2800, 40,, 80
```

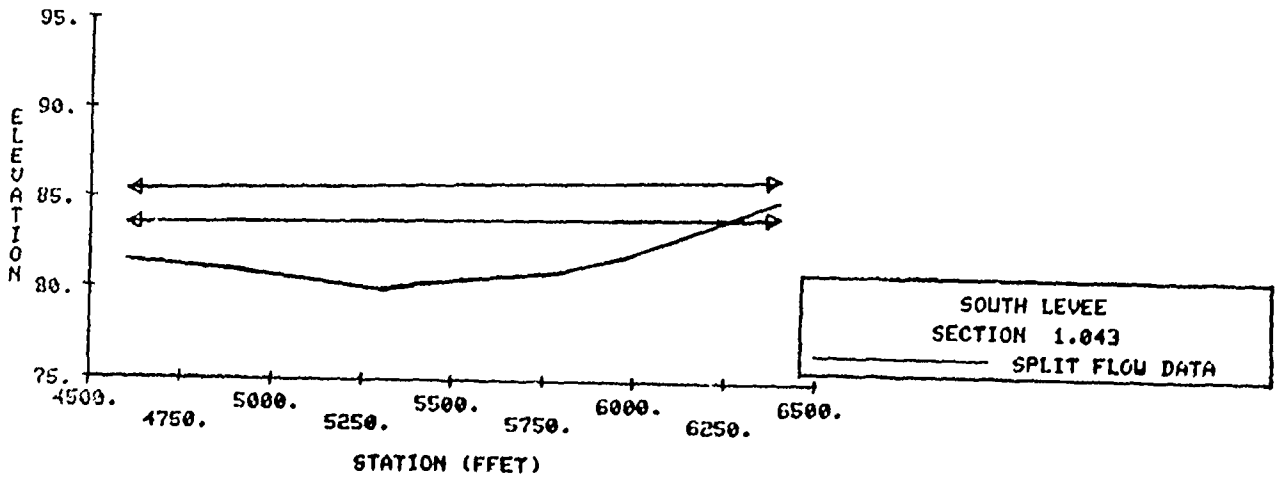


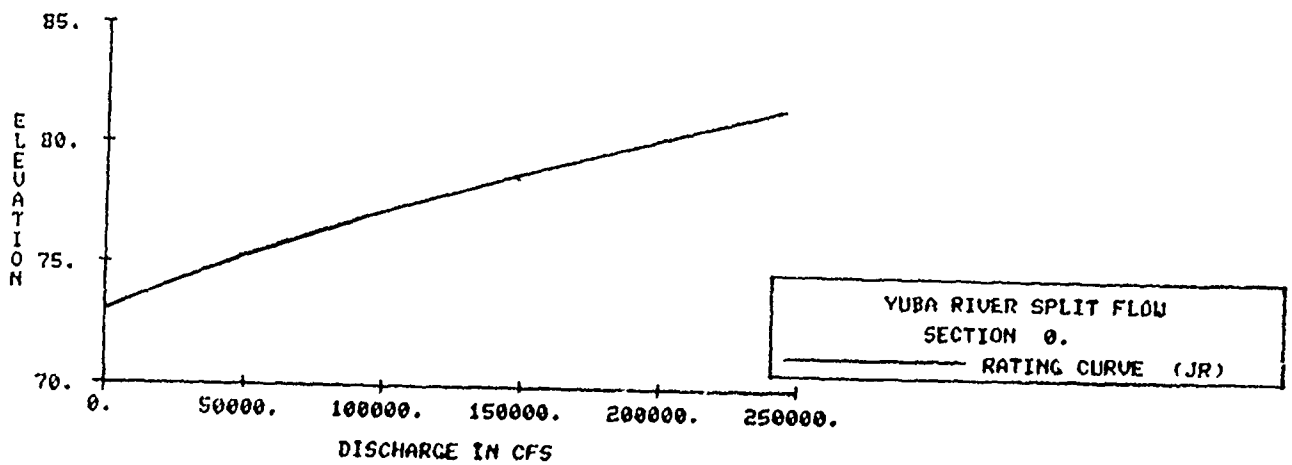






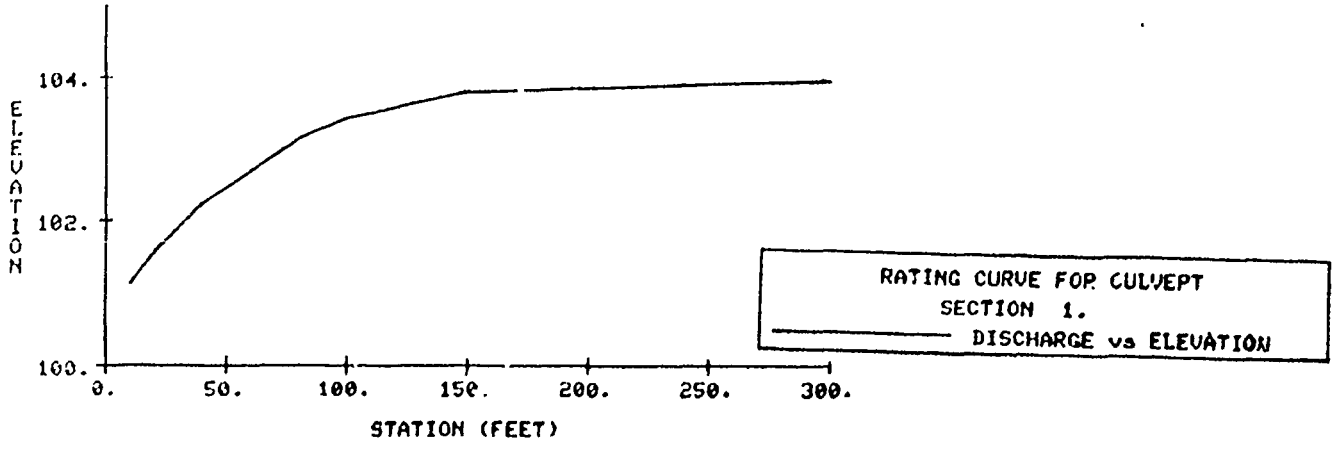

100.
80.
60.
40.
20.
ELEVATION
0.
1000.
2000.
3000.
4000.
5000.
6000.
7000.
8000.
STATION (FEET)
YUBA RIVER SPLIT FLOW
SECTION 1.58
GROUND PROFILE (GR)
FINAL GEOMETRY
L LEFT BANK (X1)
R RIGHT BANK (X1)


95.
90.
85.
80.
75.
ELEVATION
4500.
4750.
5000.
5250.
5500.
5750.
6000.
6250.
6500.
STATION (FFET)
SOUTH LEVEE
SECTION 1.043
SPLIT FLOW DATA


85.
80.
75.
70.
ELEVATION
0.
50000.
100000.
150000.
200000.
250000.
DISCHARGE IN CFS
YUBA RIVER SPLIT FLOW
SECTION 0.
RATING CURVE (JR)

2.b Example of HEC-2 (TAPE95) Output Plots Using Variables vs. Variable Option.

```
HGP

 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
V
    ***** VARIABLE vs VARIABLE PLOTTING MODULE *****
  ENTER TAPE95 FILE NAME  ???
T1695



      ****************************************
      *HYDRAULICS GRAPHICS PACKAGE           *
      *CROSS-SECTION PLOTTING PROGRAM        *
      *VERSION 1       JUNE   2, 1983        *
      ****************************************

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

      GLBL,RATING CURVE FOR CULVERT

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

      DEFINE

      EXISTING CURVE SPECS, TO ELIMINATE CURVE, ENTER "NULL" FOR SYMBOL + LINE OPTS

      CURVE    1     PLOTS DATA FOR*     GROU  ND P  ROFI  LE (  GR)
      XVAR=    0.,     YVAR=    0.,     SYMBOL= DEFA   , LINE= DEFA , CHARAC SIZE= 0.08
       ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
      1,43,1,NULL,LINE,NULL,DISCHARGE vs ELEVATION
      CURVE    2     PLOTS DATA FOR*     TOP   OF R  OAD   (BT)
      XVAR=    0.,     YVAR=    0.,     SYMBOL= DEFA   , LINE= DEFA , CHARAC SIZE= 0.08
       ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
      ALL

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

      GO
```

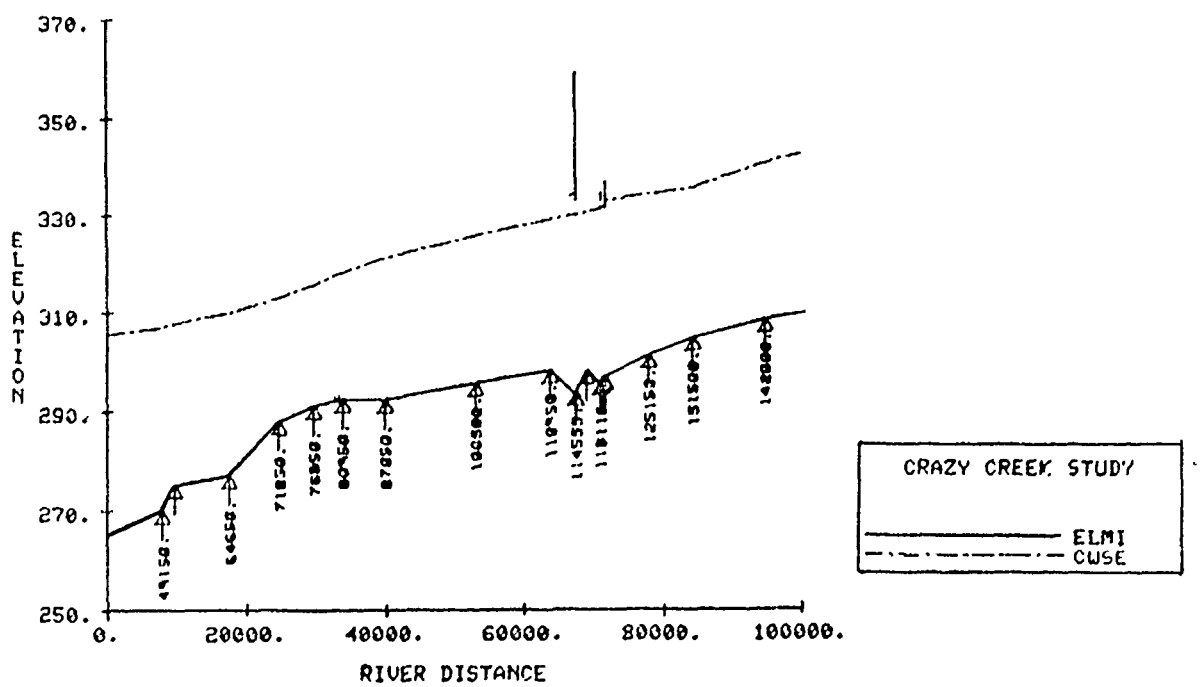


3. Example Plots Using the Profile Plotting Program (PROFPL).

```
HGP                          (Macro Command)

 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
p
*****PROFILE MODULE BEING EXECUTED*****
   ENTER FILE NAME FOR TAPE95 ???
T1695
```

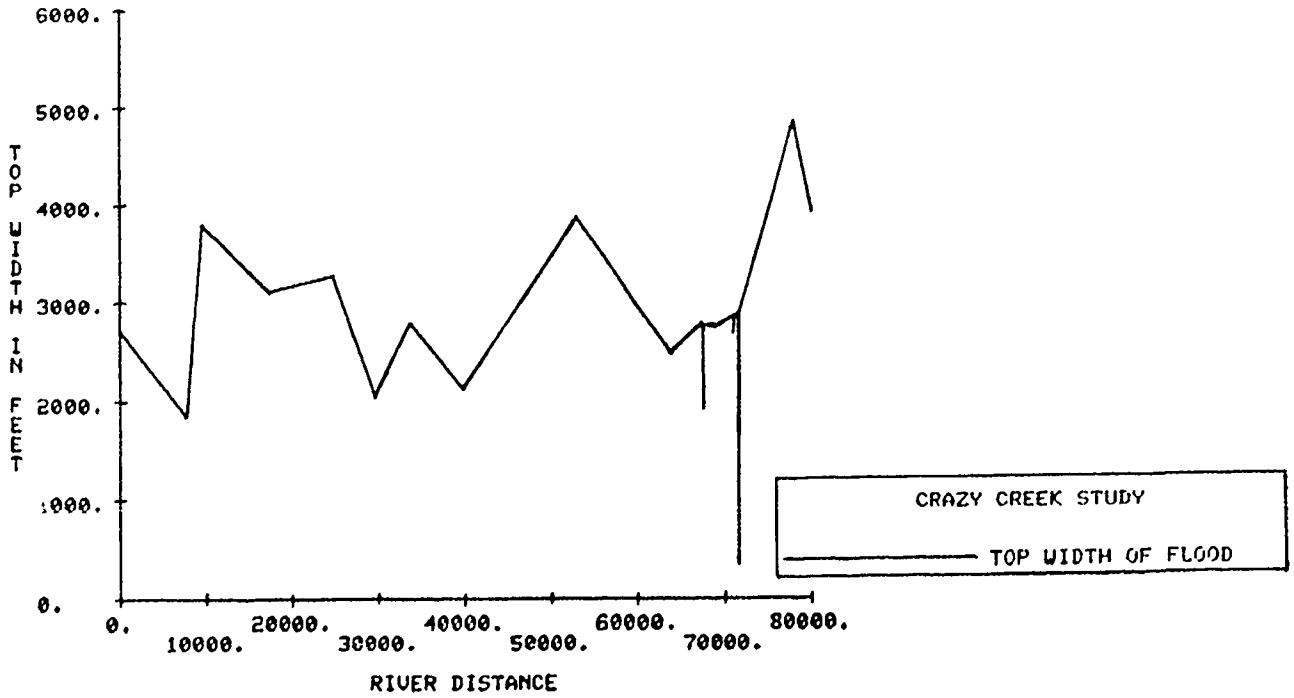
3.a Example of Profile Plot (WSEL vs RIVER DISTANCE)

```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE             *
*PROFILE PLOTTING PROGRAM                *
*VERSION 1       JUNE   2,1983          *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
BRIDGE,1

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO

  MANUAL WINDOWING  OR NEW DATA OR FINI
```



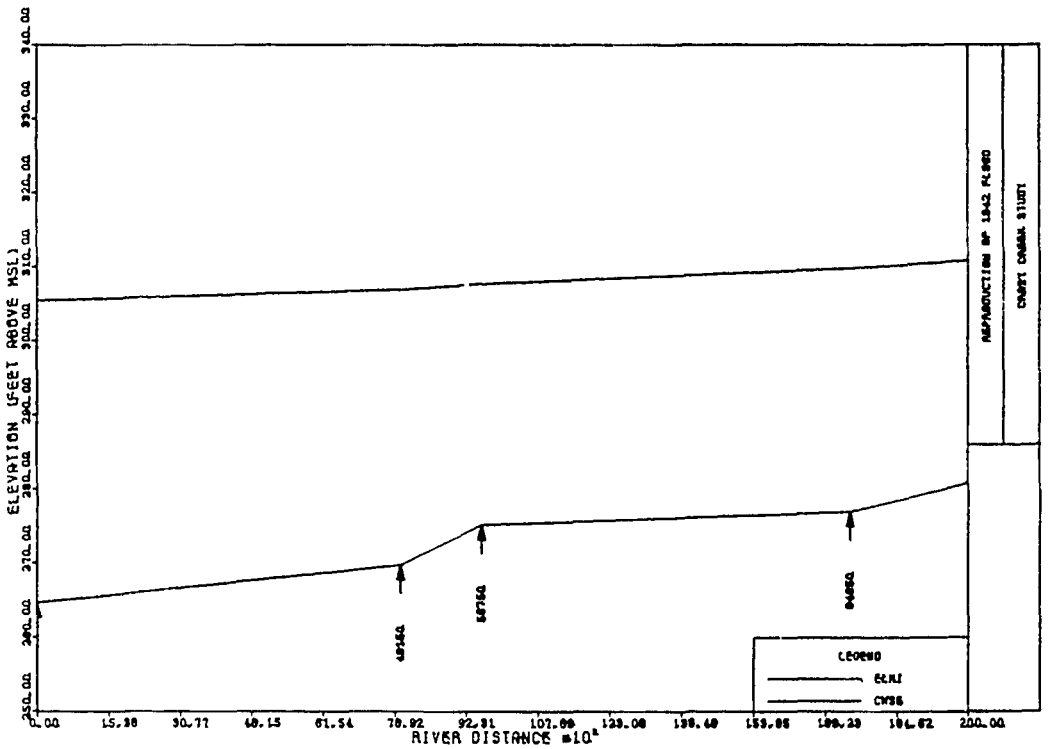
3b. Example Using the "DEFINE" Command.

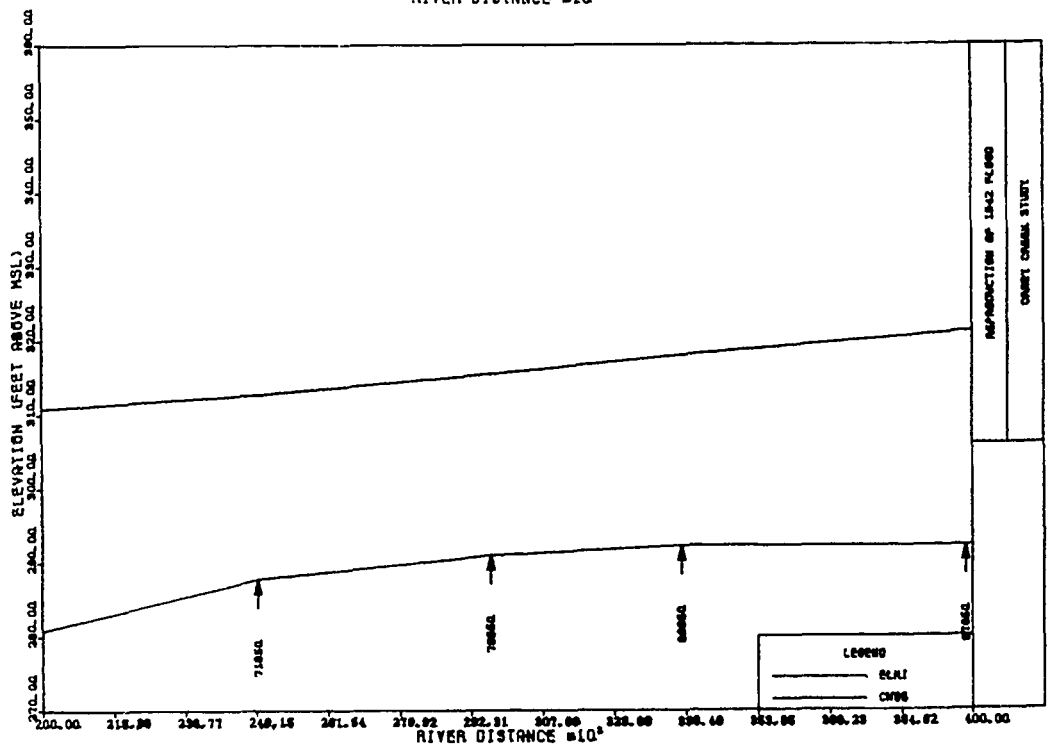
```
****************************************
*HYDRAULICS GRAPHICS PACKAGE           *
*PROFILE PLOTTING PROGRAM              *
*VERSION 1       JUNE   2,1983         *
****************************************


ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,CRAZY CREEK STUDY

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SECNO,0

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
YLBL,TOP WIDTH IN FEET

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
DEFINE

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
REPETITIVE USER SPECIFYING ROUTINE

ENTER THE FOLLOWING DATA  ;ENTER "ALL" TO TERMINATE INPUT


 CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
1  42.   1.  NULL  LINE    1.
 1,4,1,NULL,LINE,,TOP WIDTH OF FLOOD
 CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
2   1.   1.  NULL  DASH    1.
 ALL

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```

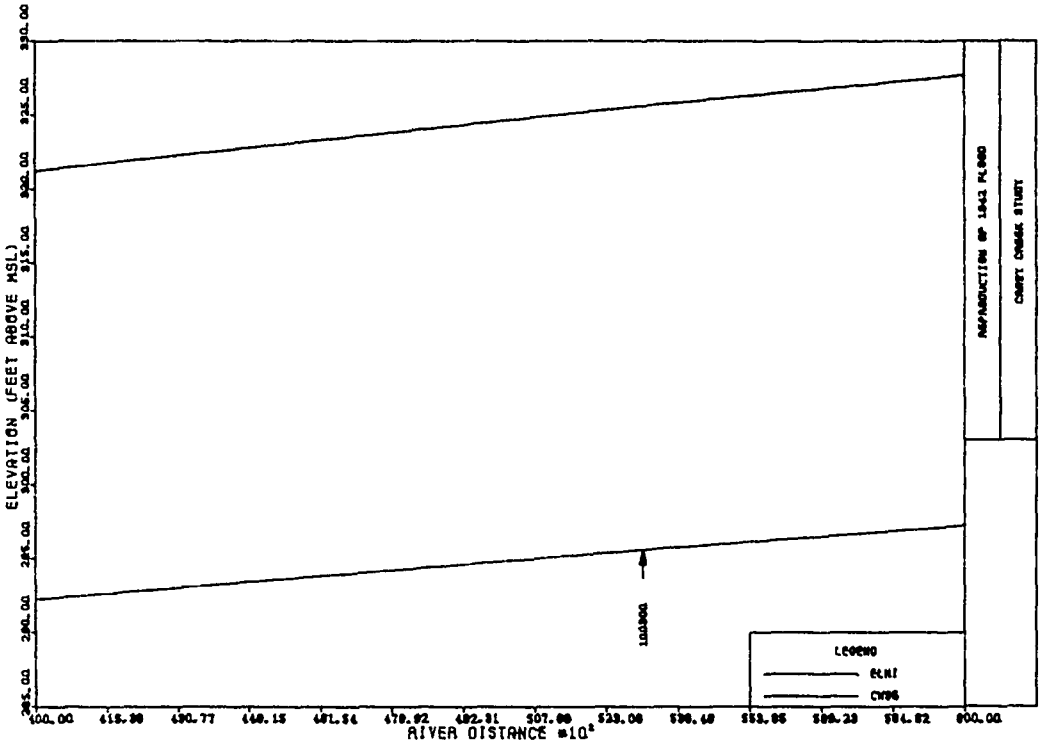


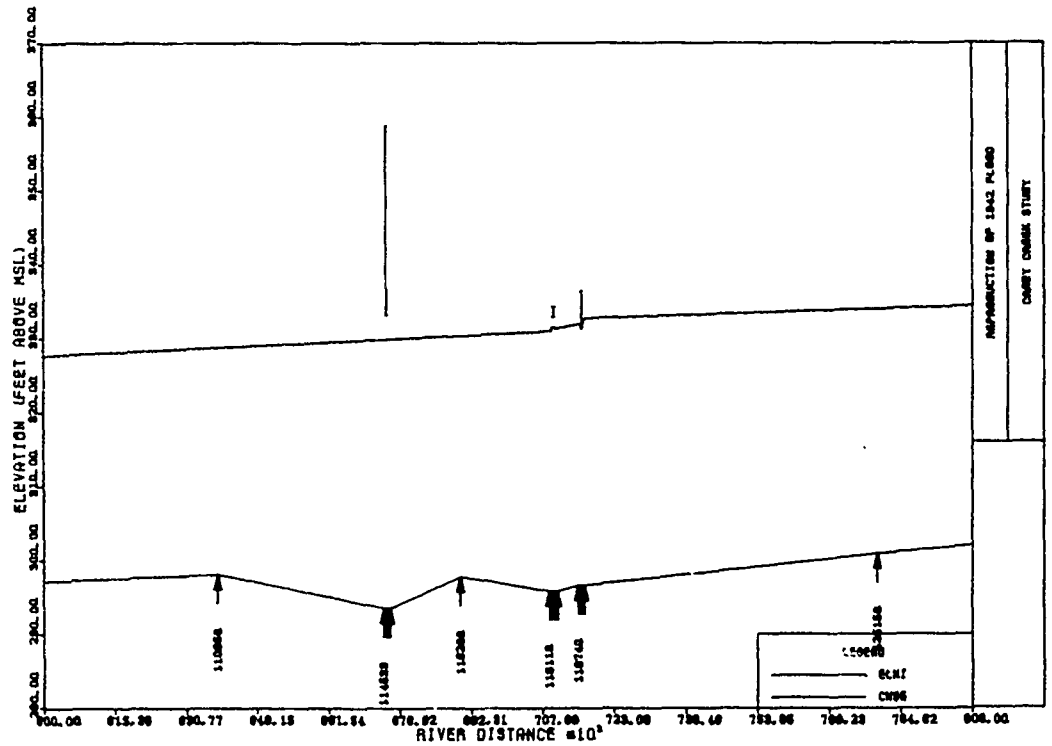
3c. Example Using "SACLE" and "CALCOMP" Commands.

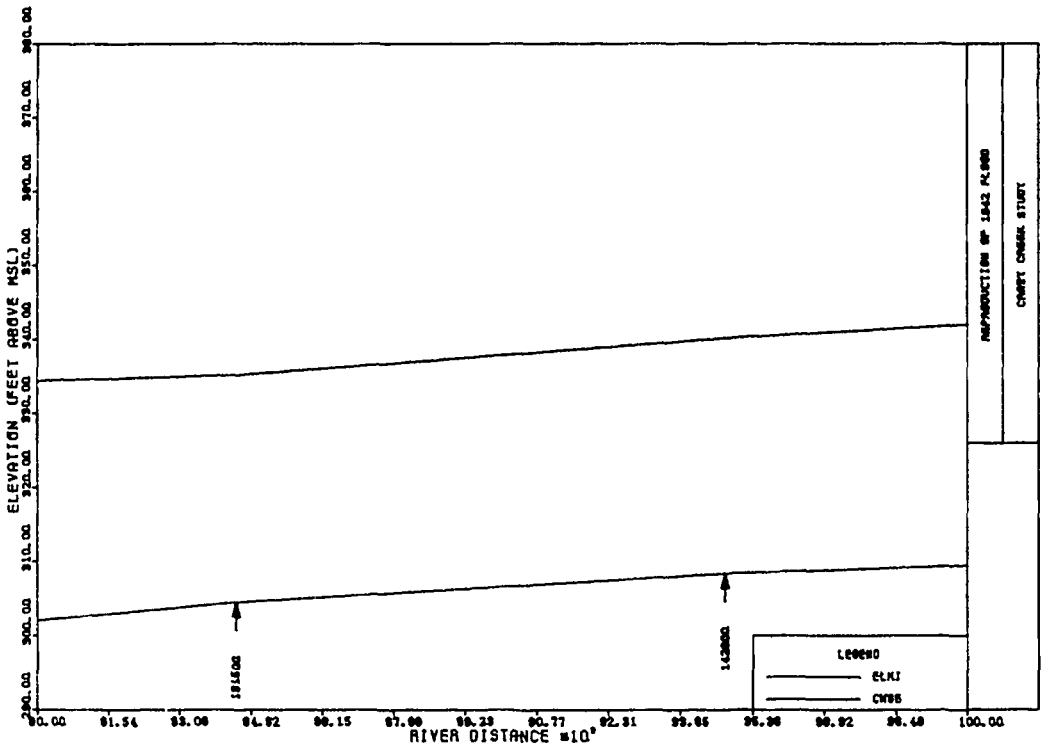
```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*PROFILE PLOTTING PROGRAM               *
*VERSION 1       JUNE   2,1983          *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
CALCOMP

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
FACTOR,.5

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,CRAZY CREEK STUDY

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SLOC,REPRODUCTION OF 1942 FLOOD

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
BRIDGE,1

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SCALE

IWINDO     XMIN       XPI        XMAX       YMIN       YPI        YMAX

2,0,,20000

SPECIFIC SCALES ENTERED FOR    1     CURVES
CURVE      XMIN       XPI        XMAX       YMIN       YPI        YMAX
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    2     0.000      0.000 20000.000      0.000      0.000      0.000

3,20000,,40000

SPECIFIC SCALES ENTERED FOR    2     CURVES
CURVE      XMIN       XPI        XMAX       YMIN       YPI        YMAX
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    3 20000.000      0.000 40000.000      0.000      0.000      0.000

4,40000,,60000

SPECIFIC SCALES ENTERED FOR    3     CURVES
CURVE      XMIN       XPI        XMAX       YMIN       YPI        YMAX
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    4 40000.000      0.000 60000.000      0.000      0.000      0.000

5,60000,,80000

SPECIFIC SCALES ENTERED FOR    4     CURVES
CURVE      XMIN       XPI        XMAX       YMIN       YPI        YMAX
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    5 60000.000      0.000 80000.000      0.000      0.000      0.000

6,80000,,10000

SPECIFIC SCALES ENTERED FOR    5     CURVES
CURVE      XMIN       XPI        XMAX       YMIN       YPI        YMAX
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    6 80000.000      0.000 10000.000      0.000      0.000      0.000

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```


ELEVATION (FEET ABOVE MSL)
RIVER DISTANCE x10³
REPRODUCTION OF 1842 FLOOD
CHART CHANNEL STUDY
LEGEND
ECRI
CWRB


ELEVATION (FEET ABOVE MSL)
RIVER DISTANCE x10³
REPRODUCTION OF 1842 FLOOD
CHART CHANNEL STUDY
LEGEND
ECRI
CWRB


ELEVATION (FEET ABOVE MSL)
RIVER DISTANCE x10³
REPRODUCTION OF 1942 PLOOD
CHERT CREEK STUDY
LEGEND
ECNI
CW96

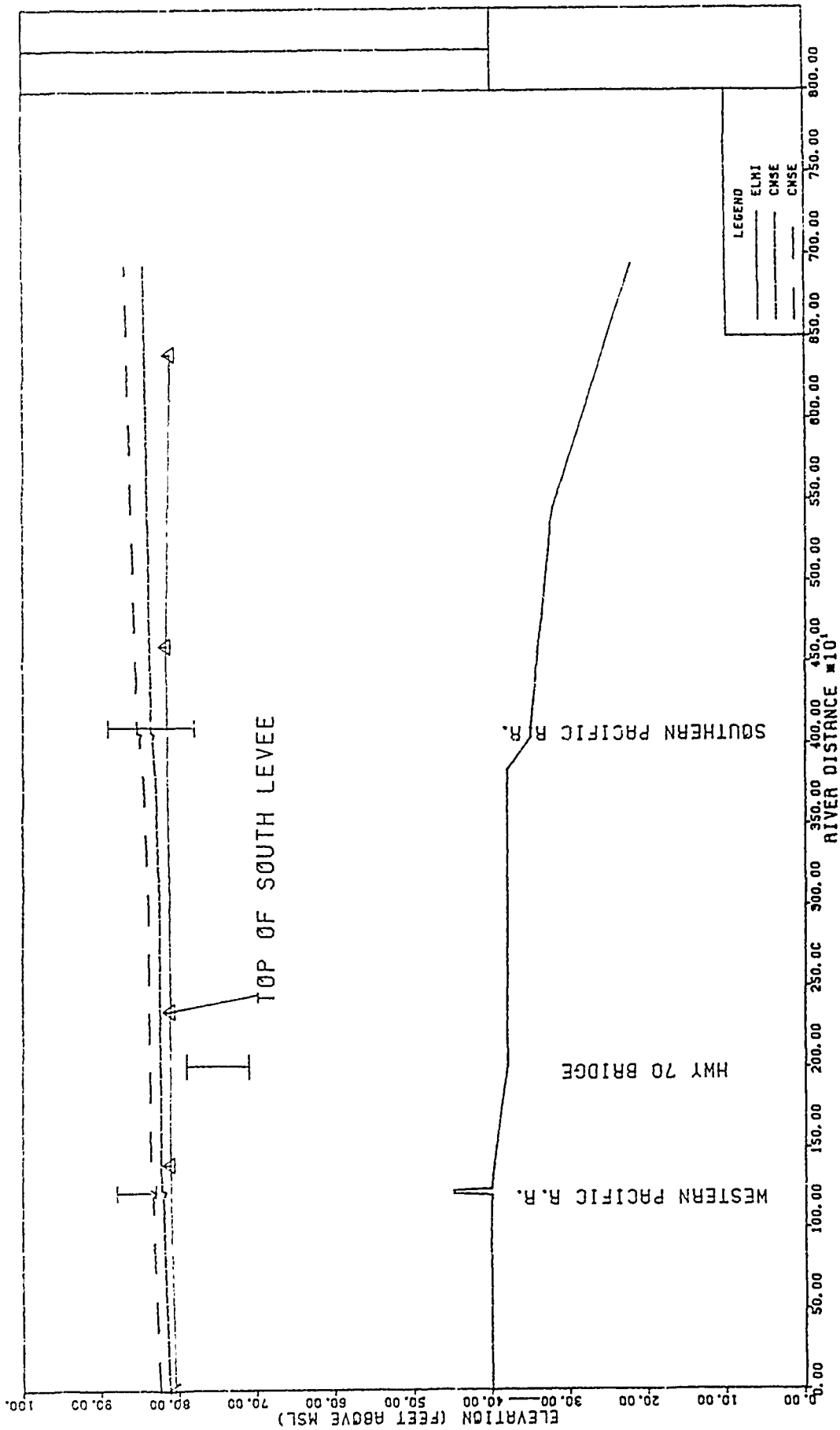

ELEVATION (FEET ABOVE MSL)
RIVER DISTANCE x10³
REPRODUCTION OF 1942 PLOOD
CHERT CREEK STUDY
LEGEND
ECNI
CW96


ELEVATION (FEET ABOVE MSL)
RIVER DISTANCE *10³
LEGEND
ELKI
CWBS
CWBS STUDY

3d. Example of the LABEL command.

```
**********************************
*HYDRAULICS GRAPHICS PACKAGE     *
*PROFILE PLOTTING PROGRAM        *
*VERSION 1       JUNE  2,1983    *
**********************************


ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
I$!RUN CALPLOT
!RUN CALPLOT
CALCOMP
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
FACTOR,.66
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GXMIN,1,GXMAX,17,GYMIN,1,GYMAX,11
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SCALE
IWINDO    XMIN      XPI       XMAX      YMIN      YPI       YMAX
2,0,,8000,0,,100
SPECIFIC SCALES ENTERED FOR    1     CURVES
CURVE      XMIN       XPI       XMAX      YMIN       YPI       YMAX
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
    2     0.000     0.000  8000.000     0.000     0.000   100.000
ALL
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
LABEL
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
               REPETITIVE USER SPECIFYING ROUTINE

ENTER THE FOLLOWING DATA  ;ENTER "ALL" TO TERMINATE INPUT



TYPE(1,2,3)  X-VALUE  Y-VALUE  ANGLE/Y2-VALUE  SIZE  LABEL  SYMBOL  ICODE(-1,-2)  PEN


1,1230,88,83,.2,,,,2,
1,2010,79,71,.3,
1,4100,89,78,.2,
2,1230,5,90,.166,WESTERN PACIFIC R.R.
2,2010,10,90,,HWY 70 BRIDGE
2,4100,5,90,,SOUTHERN PACIFIC R.R.
3,0,80.4,0,.2,,2,-1,3,
3,1400,81,0,.2,,2,-2,3,
3,2350,81,0,.2,,2,-2,3,
3,4600,81.5,0,
3,6400,81,,
3,2360,80.8,,.05,,17,-1,2
3,2460,70,,.01,,,-2,
2,2470,69.9,0,.2,TOP OF SOUTH LEVEE
ALL
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
I$GO
```

Example of the LABEL command, cont.



4. Table of HEC-2 (TAPE95) Output Variables

Code Number	Variable Name	Description
1	CWSEL	Computed water surface elevation.
2	CRIWS	Critical water surface elevation.
3	EG	Energy gradient elevation for a cross section which is equal to the computed water surface elevation CWSEL plus the discharge weighted velocity head HV.
4	TOPWID	Cross section width at the calculated water surface elevation.
5	SLOPE (10K*S)	Slope of the energy grade line for the current section (times 10,000).
6	TIME	Travel time from the first cross section to the present cross section in hours.
7	VOL	Cumulative volume of water in the stream from the first cross section (in acre-feet for English units or 1000 cubic meters in Metric units.
8	DEPTH	Depth of flow.
9	WSELK	Known water surface elevation.
10	HV	Mean velocity head.
11	HL	Energy loss due to friction.
12	OLOSS	Energy loss due to expansion or contraction.
13	QLOB	Amount of flow in the left overbank.
14	QCH	Amount of flow in the channel.
15	QROB	Amount of flow in the right overbank.
16	XNL (K*XNL)	Manning's 'n' for the left overbank area (time 1,000).
17	XNCH (K*XNCH)	Manning's 'n' for the channel area (times 1,000).

Code Number	Variable Name	Description
18	XNR (K*XNR)	Manning's 'n' for the right overbank area (times 1,000).
19	WTN (K*WTN)	Weighted value of Manning's 'n' for the channel based on the distance between cross sections and channel flow from the first cross section. Used when computing Manning's 'n' from high water marks (times 1,000).
20	CASE	A variable indicating how the water surface elevation was computed. Values of -1, -2, -3, and 0 indicate assumptions of critical depth, minimum difference a fixed change (X5 card) or a balance between the computed and assumed water surface elevations.
21	STCHL	Station of the left bank.
22	STCHR	Station of the right bank.
23	XLBEL	Left bank elevation.
24	RBEL	Right bank elevation.
25	AREA	Cross section area.
26	VCH	Mean velocity in the channel.
27	STENCL	The station of the left encroachment.
28	STENCR	The station of the right encroachment.
29	CLSTA	The centerline station of the trapezoidal excavation.
30	BW	The bottom width of the trapezoidal excavation.
31	ELENCL	Elevation of left encroachment.
32	ELENCR	Elevation of right encroachment.
33	CHSLOP (K*CHSL)	Channel slope (times 1,000).
34	.01K	The total discharge (index Q) carried with $S^{1/2}$ = .01 (equivalent to 0.1 times conveyance).
35	QLOBP	Percent of flow in the left overbank.

Code Number	Variable Name	Description
36	PERENC	The target of encroachment requested on ET card.
37	TWA	The cumulative topwidth area (acres or 1000 square meters).
38	SECNO	The cross section identification number.
39	XLCH	Channel reach length.
40	ELTRD	Minimum elevation for top of road profile.
41	ELLC	Maximum elevation for top of road profile.
42	ELMIN	Minimum elevation in cross section.
43	Q	Discharge.
44	EGPRS	Energy elevation assuming pressure flow.
45	EGLWC	Energy elevation assuming low flow.
46	QWEIR	Total weir flow at the bridge.
47	QPR	Total pressure or low flow at the bridge.
48	H3	Change in water surface elevation from Yarnell's equation.
49	CLASS	Controlling flow type for bridge solution.
50	DIFWSP	Difference in water surface elevation for each profile.
51	DIFWSX	Difference in water surface elevation between sections.
52	DIFKWS	Difference between known and computed water surface elevations.
53	SSTA	Starting station where the water surface intersects the ground (on the left side of the cross section).
54	ENDST	Ending station where the water surface intersects the ground on the right side.

Code Number	Variable Name	Description
55	VLOB	Average velocity in the left overbank area.
56	VROB	Average velocity in the right overbank area.
57	ALPHA	Velocity head coefficient.
58	KRATIO	Ratio of the upstream to downstream coveyance
59	QROBP	Percent of flow in the right bank.
60	QCHP	Percent of flow in the channel.
61	DIFEG	Difference in energy elevation for each profile.
62	IHLEQ	Friction loss equation index.
63	TELMX	Elevation of the lower of the two end points of the cross section.
64	TH1	Value for T/H based on an H equal to the maximum depth in the channel.
65	XICE-1	Calculated stability factor X based on TH1.
66	XSTAB1	Stability factor based on Pariset Curve based on TH1.
67	XFCH1	Froude Number for the channel based on H equal to the maximum depth in the channel.
68	TH2	Value for T/H based on an H = ACH/BCH (Hydraulic Depth).
69	XICE2	Calculated stability factor X based on TH2.
70	XSTAB2	Stability factor based on Pariset Curve based on TH2.
71	XFCH2	Froude Number for the channel based on H = ACH/BCH.
72	TH3	Value for T/H based on an H = ACH/WPCH (Hydraulic RAdius).
73	XICE3	Calculated stability factor X based on TH3.

Code Number	Variable Name	Description
74	XSTAB3	Stability factor based on Pariset Curve based on TH3.
75	XFCH3	Froude Number for the channel based on H = A/WPCH.
76	TH4	T/H value based on the average of the present and previous values of channel top, width and depth.
77	XICE4	Calculated X value based on the average value between the present and previous values for ZITCH, DEPTH, QCH, C and BCH.
78	XSTAB4	Stability factor based on Pariset Curve for average TH4.
79	XFCH4	Froude Number based on average values of present and previous VCH and H.
80	ZINCH	Channel n value based on Belokon-Sabaneev Formula.
81	TVOLI	Cumulative volume of ice in cubic yards or cubic meters.
82	VOLIL	Cumulative volume of ice on left bank.
83	VOLIR	Cumulative volume of ice on right bank.
84	VOLICH	Cumulative volume of ice in the channel.
85	NICE	ICE n value read in.
86	ZITL	Ice thickness for the left bank.
87	ZITR	Ice thickness for the right bank.
88	ZITCH	Ice thickness for the channel.
89	VEXR	Volume of excavation in reach.
90	VEXT	Volume of excavation, total.

5. HARRIS 500 HGP Macro.

```
MS
$
$ THIS MACRO IS USED TO EXECUTE THE HYDRAULICS GRAPHICS PACKAGE
$
FR ALL
$ ASSIGN THE INPUT AND OUTPUT FILES TO TERMINAL BEING USED
AS 5=*
AS 6=*
$ SET UP THE SCRATCH FILES
AS 2=W2
AS 33=W3
AS 99=W9
PR
PR  ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
PR
SR.IT #X
IF (#X = STOP) JU !ENDIT
IF (#X = XSECPL .OR. #X = X) JU !SECPLO
IF (#X = VAR .OR. #X = V) JU !VAR
PR
PR *****PROFILE MODULE BEING EXECUTED*****
PR
PR    ENTER FILE NAME FOR TAPE95 ???
PR
SR.IT #A
IF (#A = STOP) JU !ENDIT
AS 95=#A
HLIB*HGPPX
JU !ENDIT
!VAR PR
PR     ***** VARIABLE vs VARIABLE PLOTTING MODULE *****
PR
PR   ENTER TAPE95 FILE NAME  ???
AS 2=W8
SR.IT #A
IF (#A = STOP) JU !ENDIT
AS 95=#A
AS 1=W2
AS 4=W4
HLIB*HGPCX
JU !ENDIT
!SECPLO PR
PR     ***** CROSS SECTION PLOTTING MODULE *****
PR
PR  ENTER  HEC2/HEC6/GEDA  INPUT FILE NAME ???
PR
SR.IT #Y
IF (#Y = STOP) JU !ENDIT
AS 2=#Y
PR
PR  ENTER  TAPE95  FILE NAME ???
PR  ENTER  "NO"  IF NONE IS TO BE USED
PR
SR.IT #A
IF (#A = STOP) JU !ENDIT
AS 95=W8
IF (#A .NE. N .AND. #A .NE. NO) AS 95=#A
AS 1=W2 4=W4
HLIB*HGPCX
!ENDIT PR FILE  W9  CONTAINS CALCOMP PLOT FILE IF CALCOMP BEING USED
```

Appendix III

HGP GEDA EXAMPLES

Appendix III

HGP GEDA EXAMPLES

Contents

1. Introduction

The following examples using the HGP program are based on input and output data from the GEDA hydraulics program. The examples given are designed to help the user understand the HGP commands as they apply to the different options when using GEDA data.

Each hydraulics program generates its own unique list of TAPE95 output variables. The method used by the user to specify which variables are to be used for plotting from TAPE95 is by specifying a variable number to the HGP. A table of variable numbers and their descriptions is given in Section 4.

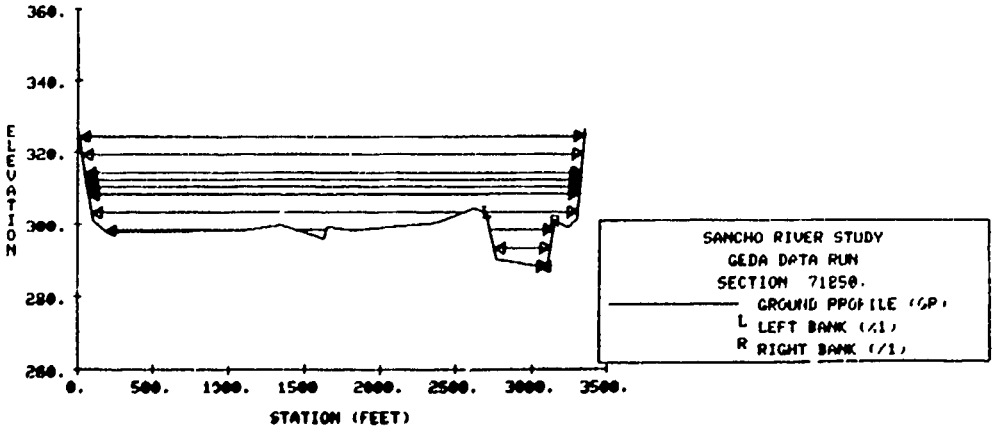
The following examples were run interactively on a HARRIS 500 computer using a TEKTRONIX 4014 terminal and utilizing a macro called HGP to assign the files.

2. Example Plots Using the Cross Section Plotting Program (XSECPL).

```
HGP

 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)

X

    ***** CROSS SECTION PLOTTING MODULE *****

 ENTER  HEC2/HEC6/GEDA  INPUT FILE NAME ???

GDATA

 ENTER  TAPE95  FILE NAME ???
 ENTER  NO  IF NONE IS TO BE USED

G95
```

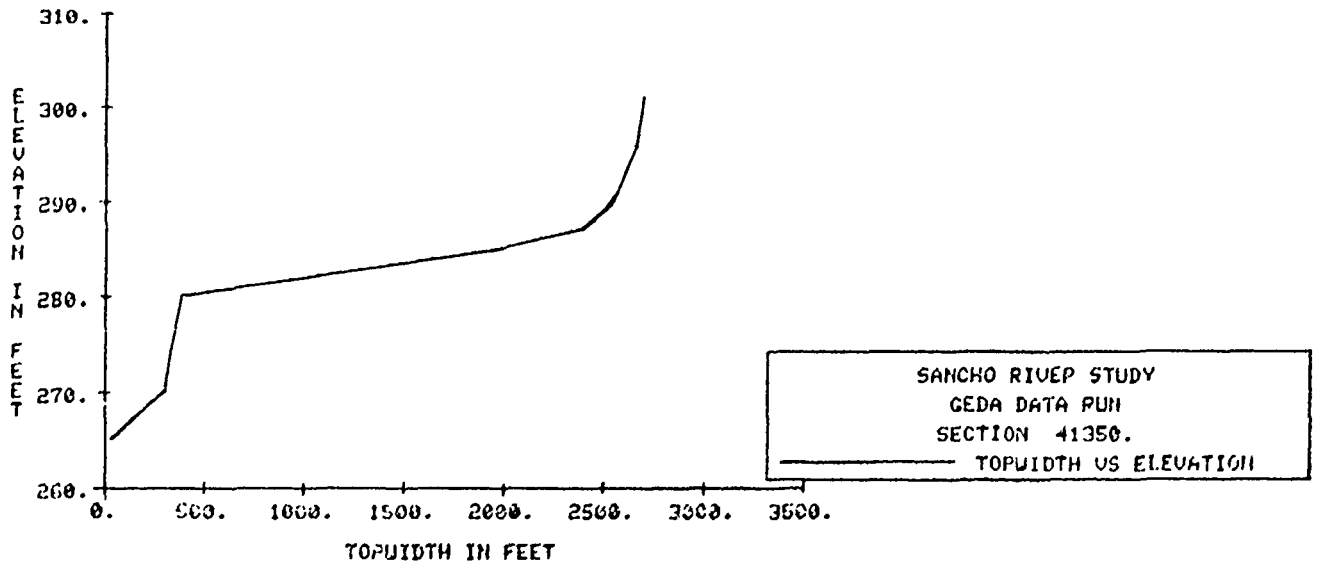
2.a Example of GEDA Cross Section Input Plots With Water Surface Lines (Tape 95).

```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*CROSS-SECTION PLOTTING PROGRAM         *
*VERSION 1       JUNE   2, 1983         *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,SANCHO RIVER STUDY

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SLOC,GEDA DATA RUN

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```



2b. Example of GEDA (TAPE95) Output Plots Using Variable vs. Variable Option.

```
HGP

 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)

VAR

    ***** VARIABLE vs VARIABLE PLOTTING MODULE *****

  ENTER TAPE95 FILE NAME  ???
G95


      ****************************************
      *HYDRAULICS GRAPHICS PACKAGE           *
      *CROSS-SECTION PLOTTING PROGRAM        *
      *VERSION 1       JUNE   2, 1983        *
      ****************************************

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
      GLBL,SANCHO RIVER STUDY

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
      SLOC,GEDA DATA RUN

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
      XLBL,TOPWIDTH IN FEET

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
      YLBL,ELEVATION IN FEET

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
      DEFINE


      EXISTING CURVE SPECS, TO ELIMINATE CURVE, ENTER "NULL" FOR SYMBOL + LINE OPTS

      CURVE   1     PLOTS DATA FOR*     GROU  ND P  ROFI  LE (  GR)
                     XVAR=   0.,     YVAR=   0.,     SYMBOL= DEFA  , LINE= DEFA
       ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
      1,4,1,NULL,LINE,,TOPWIDTH VS ELEVATION

      CURVE   2     PLOTS DATA FOR*     TOP   OF R  OAD   (BT)
                     XVAR=   0.,     YVAR=   0.,     SYMBOL= DEFA  , LINE= DEFA
       ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
      ALL

      ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
      GO
```

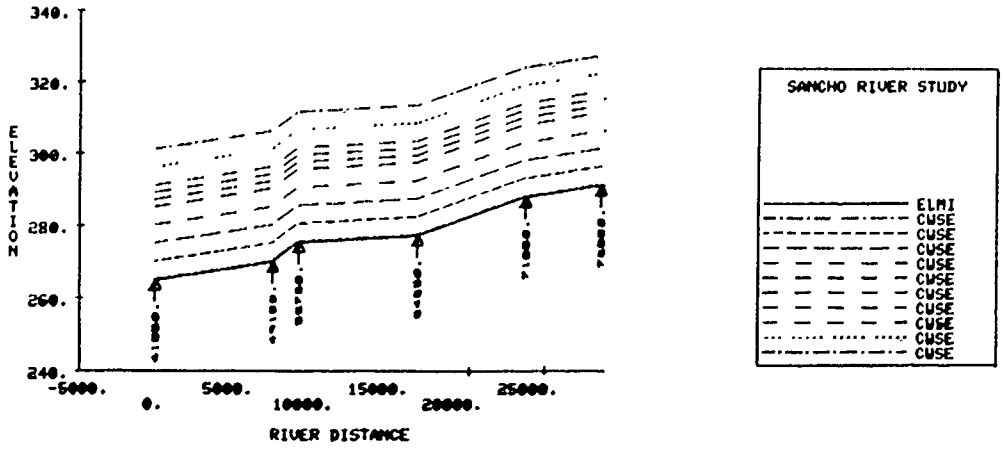


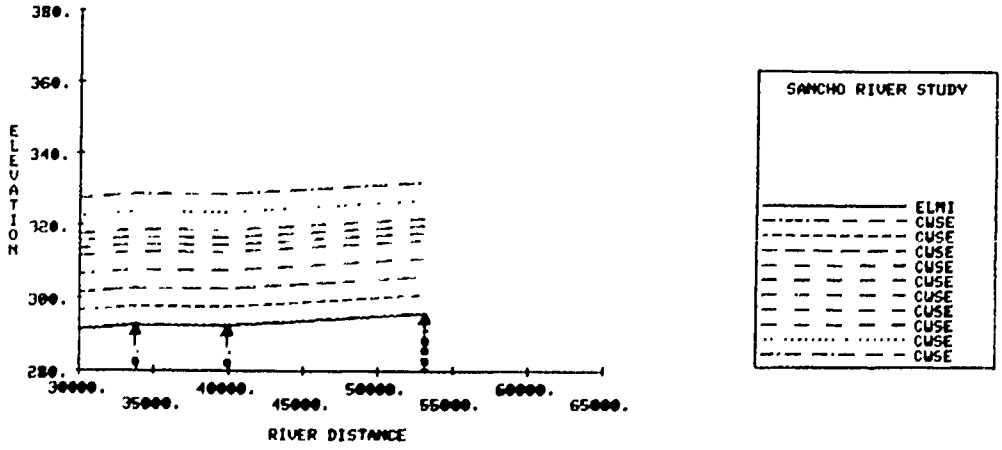
3. Example Plots Using the Profile Plotting Program (PROFPL).

```
HGP
 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
P
*****PROFILE MODULE BEING EXECUTED*****
   ENTER FILE NAME FOR TAPE95 ???
G95
```

3.a Example of Profile Plot (WSEL vs River Distance).

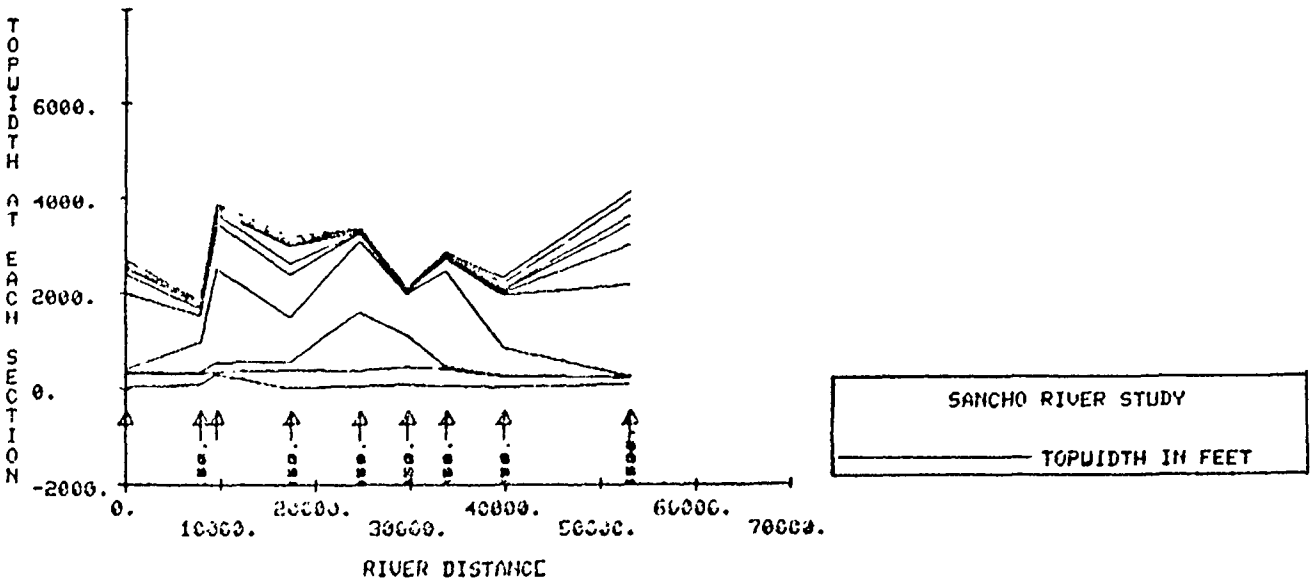
```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*PROFILE PLOTTING PROGRAM               *
*VERSION 1       JUNE   2,1983          *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,SANCHO RIVER STUDY

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
XAUPI,5000

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```





3b. Example of "DEFINE" Command.

```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*PROFILE PLOTTING PROGRAM               *
*VERSION 1       JUNE   2,1983          *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,SANCHO RIVER STUDY

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
YLBL,TOPWIDTH AT EACH SECTION

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
DEFINE

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                REPETITIVE USER SPECIFYING ROUTINE

ENTER THE FOLLOWING DATA  ;ENTER "ALL" TO TERMINATE INPUT


CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
    1   7.   0.  NULL  LINE     1.00 CUMULATIVE VOLUME
1,4,0,,,,TOPWIDTH IN FEET

CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
    2   1.   1.  NULL  DASH     0.07
ALL

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```



4. Table of GEDA (TAPE95) Output Variables

Code Number	Variable Name	Description
1	ECOM	Water surface elevation.
2	SCHL	Accumulated channel length.
3	XRL(NST)	Incremented weighted length.
4	SUMW	Total top width.
5	ASEL	Projection slope.
6	SDM	Accumulated weighted length.
7	AV	Cumulative volume of water in the stream from the first cross section (in acre-feet).
8	QVAR	Depth of flow in the channel
9	RWC	Ratio of flow in the channel.
10	STST	Left overbank station separating storage from conveyance.
11	ENST	Right overbank station separating storage from conveyance.
12	SUMP	Total wetted perimeter.
13	RTS	Hydraulic radius to the 2/3 power.
14	QVAR	Profile number.
15	QVAR	Cross section counter.
16	SUBK(1)*.01	Sub-conveyance value.
17	SUBK(2)*.01	Sub-conveyance value.
18	SUBK(3)*.01	Sub-conveyance value.
19	ANV	Average 'n' value.
20	SUBK(4)*.)!	Sub-conveyance value.
21	QVAR	Left bank station.
22	QVAR	Right bank station.
23	QVAR	Left bank elevation

Code Number	Variable Name	Description
24	QVAR	Right bank elevation.
25	SUMA	Cross section area.
26	SUBK(5)*.01	Sub-conveyance value.
27	STENCL	The station of the left encroachment.
28	STENCR	The station of the right encroachment.
29	SUBK(6)*.01	Sub-conveyance value.
30	SUBK(7)*.01	Sub-conveyance value.
31	ELENCL	Elevation of left encroachment.
32	ELENCR	Elevation of right encroachment.
33	QVAR	Channel slope.
34	SUMK*.01	Total conveyance.
35	SA(1)	Sub-area value.
36	SA(2)	Sub-area value.
37	ASA	Cumulative topwidth area (in acres).
38	AVGS	The cross section identification number.
39	CHL	Incremented channel length.
40	SA(3)	Sub-area value.
41	SA(4)	Sub-area value.
42	QVAR	Minimum elevation in the channel strip.
43	SA(5)	Sub-area value.
44	SA(6)	Sub-area value
45	SA(7)	Sub-area value.
46	R(1)	Sub-hydraulic radius value.
47	R(2)	Sub-hydraulic radius value.
48	R(3)	Sub-hydraulic radius value.

Code Number	Variable Name	Description
49	R(4)	Sub-hydraulic radius value.
50	R(5)	Sub-hydraulic radius value.
51	R(6)	Sub-hydrualic radius value.
52	R(7)	Sub-hydraulic radius value.
53	QVAR	Starting station where the water surface intersects the ground (on the left side of the cross section).
54	QVAR	Ending station where the water surfacue intersects the ground on the right side.
55	XNV(1)	Sub-n value.
56	XNV(2)	Sub-n value.
57	ALFA	Velocity head coefficient.
58	XNV(3)	Sub-n value.
59	XNV(4)	Sub-n value.
60	XNV(5)	Sub-n value.
61	XNV(6)	Sub-n value.
62	XNV(7)	Sub-n value.
63	QVAR	Elevation of the lower of the two end points of the cross section.
64	QVAR	Minimum channel bank slope.
65	QVAR	Minimum channel bank elevation.
66	YNF	Composite n - value.*
67	BS	Active width.*
68	BSS	Inactive width.*
69	AF	Active flow area.*

*Note: These values are consistent with input required for NWS DAMBRK and DWOPER programs.

Appendix IV

HGP HEC-6 EXAMPLES

Appendix IV

HGP HEC-6 EXAMPLES

Table of Contents

HGP HEC-6 Examples

1. Introduction

The following examples using the HGP program are based on input and output data from the HEC-6 hydraulics program. The examples given are designed to help the user understand the use of the HGP Commands as they apply to the different options, when using HEC-6 data.

Each hydraulics program generates its own unique list of TAPE95 output variables. The method used by the user to specify which variables are to be used for plotting from TAPE95 is by specifying a variable number to the HGP. A table of variable numbers and their descriptions is given in Section 4.

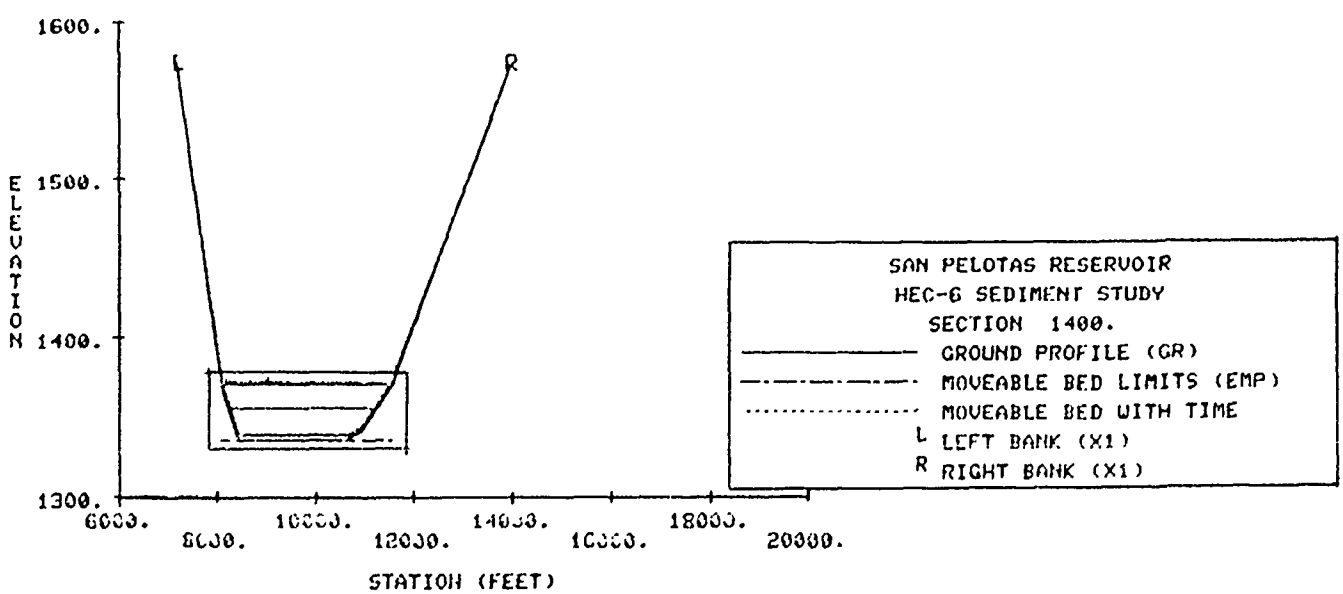
The following examples were run interactively on a HARRIS 500 computer using a TEKTRONIX 4014 terminal and a macro called HGP to assign the files.

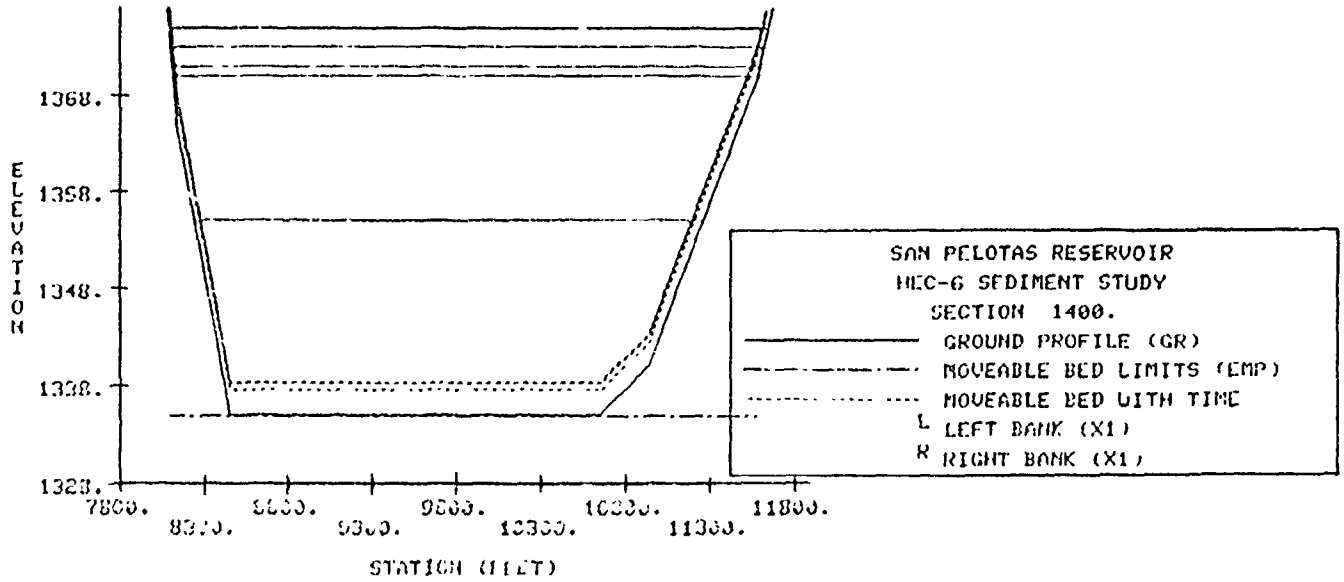
2. Example Plots Using the Cross Section Plotting Program (XSECPL).

```
HGP
 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
X
    ***** CROSS SECTION PLOTTING MODULE *****
 ENTER  HEC2/HEC6/GEDA  INPUT FILE NAME ???
HEC6D
 ENTER  TAPE95  FILE NAME ???
 ENTER  NO  IF NONE IS TO BE USED
TH695
```

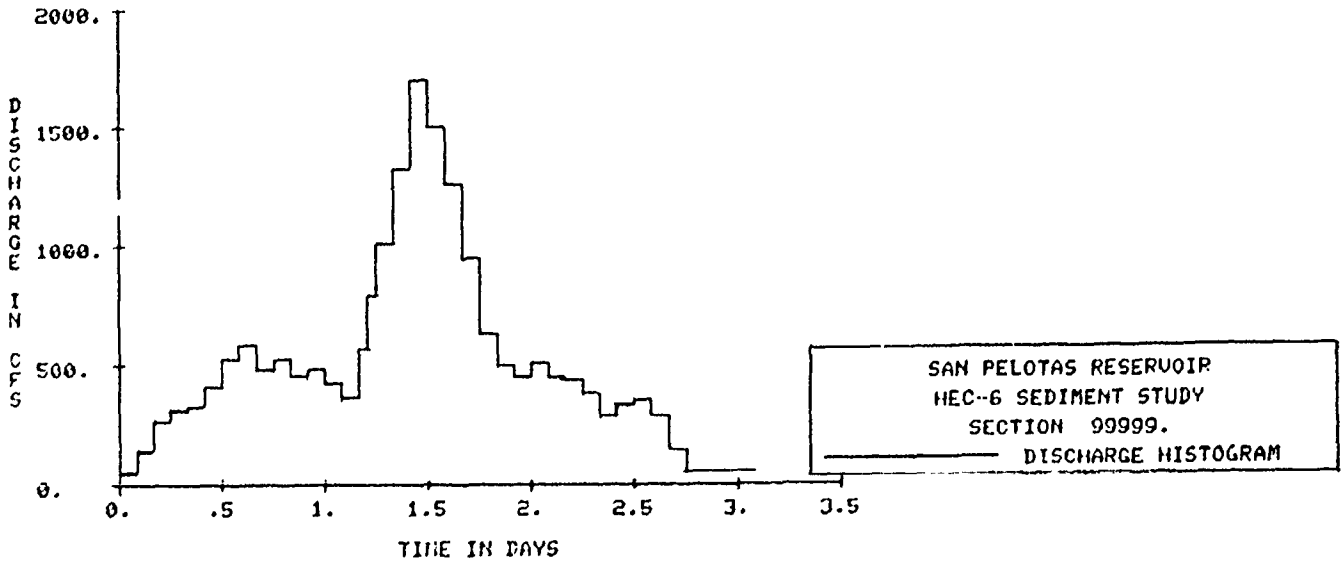
2.a Example of HEC-6 Cross Section Input Plots with Water Surface Lines.

```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*CROSS-SECTION PLOTTING PROGRAM         *
*VERSION 1       JUNE   2, 1983         *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,SAN PELOTAS RESERVOIR

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SLOC,HEC-6 SEDIMENT STUDY

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO


  35 TIME PERIODS READ
 ENTER NUMBER OF PERIODS AND PERIODS
  A MAXIMUM OF 10 ALLOWED
4,1,20,35,30                    (Time Periods 1, 20, and 30 thru 35 Used)
```



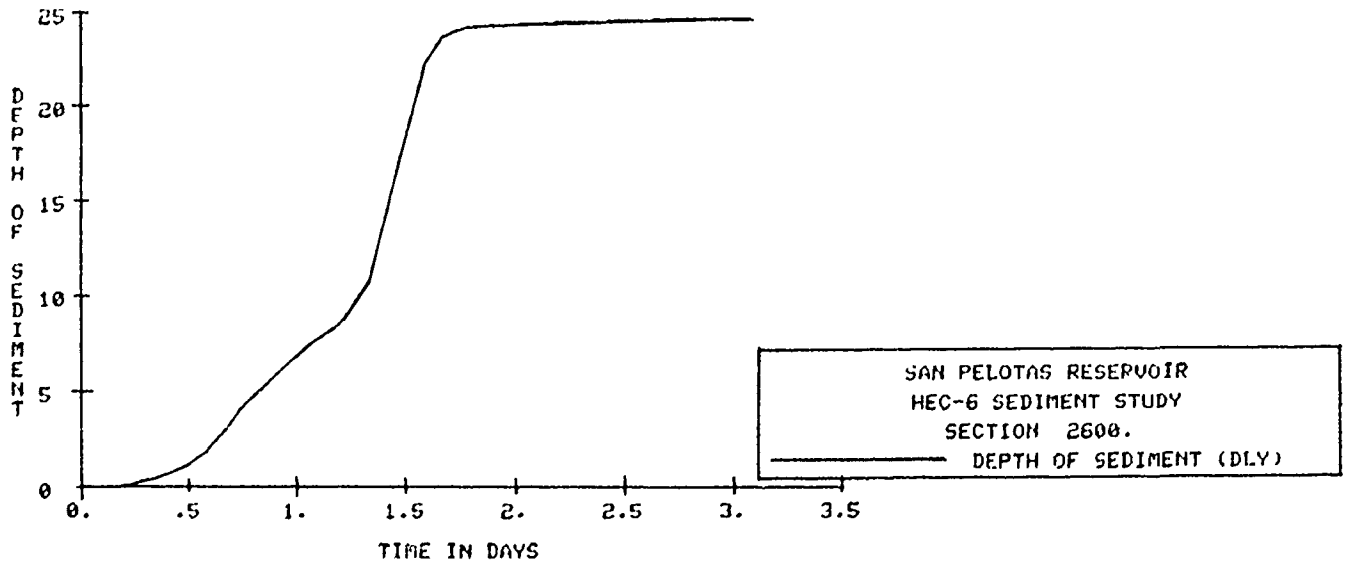


2b. Example of HEC-6 Histogram Input Plot.



2c. Example of HEC-6 (TAPE95) Output Plots Using Variable vs. Variable Option.

```
****************************************
*HYDRAULICS GRAPHICS PACKAGE           *
*CROSS-SECTION PLOTTING PROGRAM        *
*VERSION 1       JUNE   2, 1983        *
****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,SAN PELOTAS RESERVOIR

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SLOC,HEC-6 SEDIMENT STUDY

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
YLBL,DEPTH OF SEDIMENT

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SECTION,2600

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
XLBL,TIME IN DAYS

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
DEFINE


EXISTING CURVE SPECS, TO ELIMINATE CURVE, ENTER "NULL" FOR SYMBOL + LINE OPTS

CURVE   1     PLOTS DATA FOR*     GROU  ND P  ROFI  LE (  GR)
                XVAR=   0.,     YVAR=   0.,     SYMBOL= DEFA   , LINE= DEFA
 ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
1,6,11,,,,DEPTH OF SEDIMENT (DLY)

CURVE   2     PLOTS DATA FOR*     TOP   OF R  OAD   (BT)
                XVAR=   0.,     YVAR=   0.,     SYMBOL= DEFA   , LINE= DEFA
 ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
ALL

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```

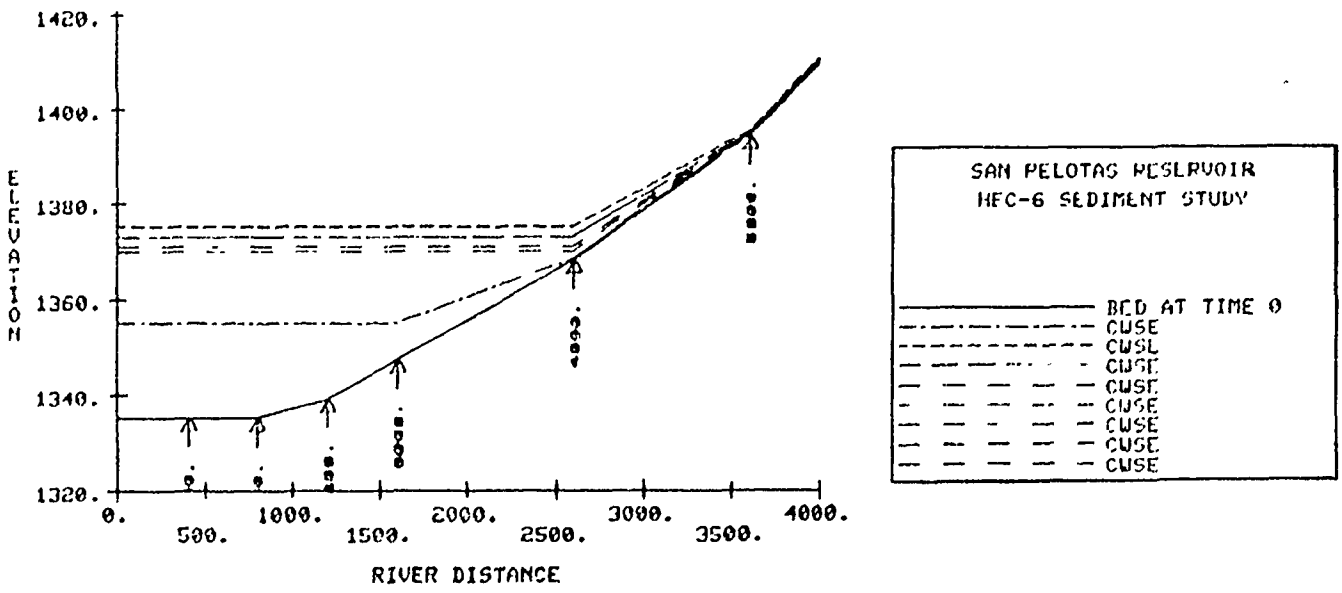


3. Example Plots Using the Profile Plotting Program (PROFPL).

```
HGP
 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
P
*****PROFILE MODULE BEING EXECUTED*****
   ENTER FILE NAME FOR TAPE95 ???
TH695
```

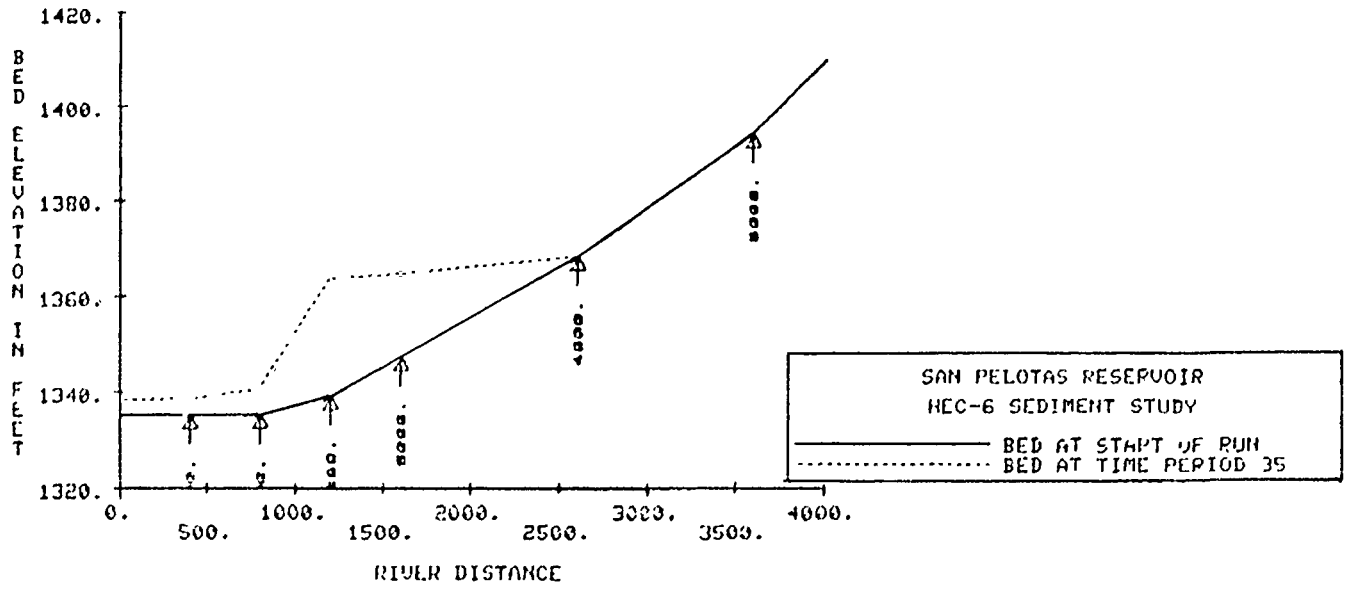
3.a Example Plot of Profile Plot (WSEL vs River Distance)

```
 ENTER THE NUMBER OF TIME PERIODS
  AND THE PERIODS A MAXIMUM OF 46 ALLOWED
4,1,20,35,30

 ******************************************
 *HYDRAULICS GRAPHICS PACKAGE             *
 *PROFILE PLOTTING PROGRAM                *
 *VERSION 1       JUNE   2,1983           *
 ******************************************

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 GLBL,SAN PELOTAS RESERVOIR

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 SLOC,HEC-6 SEDIMENT STUDY

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 CURVE,1,VARDES,BED AT TIME 0

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 GO
```



3b. Example of "DEFINE" Command.

```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*PROFILE PLOTTING PROGRAM               *
*VERSION 1       JUNE   2,1983          *
************************ ****************


ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
YLBL,BED ELEVATION IN FEET

ENTER: VARIABLE/SEPAPATOR/VALUE OR STRING
DEFINE

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                REPETITIVE USER SPECIFYING ROUTINE

ENTER THE FOLLOWING DATA  ;ENTER "ALL" TO TERMINATE INPUT


CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
    1   5.   1.  NULL  LINE    0.07
1,5,1,,,,BED AT START OF RUN

CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
    2   1.   1.  NULL  DASH    0.07
2,9,8,,D9,,BED AT TIME PERIOD 35

CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
    3   1.   2.  NULL  DASH    0.07
ALL

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```



4. Table of HEC-6 (TAPE95) Output Variables.

Code Number	Variable Name	Description
1	WSP	Water surface elevation
2	SUMW	Cross sections width at the calculated water surface elevation.
3	EL	Energy gradient elevation.
4	TOPW	Computed topwidth of moveable bed.
5	OTWP	Bed elevation at time 0.
6	ADAY	Time period in days.
7	Q	Discharge in CFS
8	ALFA	Velocity head coefficient.
9	TWP	Bed elevation at end of time period.
10	VH2	Mean velocity head across the entire cross section
11	DLY	The depth in feet of sediment deposits in relation to the original bed.
12	CHNGE	The depth im feet of sediment deposits when dredging occurs. It reflects the true sediment deposits outside the dredge bed.
13	CHNGM	The maximum CHNGE value.
14	TOTDLY	The total change in the sediment deposits. TOTDLY = CHANGE + DLY.
15	DLYGM	The change in sediment deposits due to gravel mining.
16 - 30	GSR(1)-GSR(15)	Fraction finer values.
31	GPS	Clay Load in tons per day.
32	GPS	Silt Load in tons per day.
33	GPS	Sand Load in tons per day.
34	TOTL	Total Load in tons per day.
35	PCL	Percent Clay Load.

Code Number	Variable Name	Description
36	PSI	Percent Silt Load
37	PSA	Percent Sand Load.
38	AVGS	Cross section number.
39	RL(ICH)	Channel reach length.

Appendix V

HGP DAMPOS EXAMPLES

Appendix V

HGP DAMPOS EXAMPLES

Contents

1. Introduction

The following examples using the HGP program are based on output data from the DAMPOS* program. The examples given are designed to help the user understand the use of the HGP commands as they apply to the different options when using DAMPOS data.

Each hydraulics program generates its own unique list of TAPE95 output variables. The method used by the user to specify which variables are to be used for plotting from TAPE95 is by specifying a variable number to the HGP. A table of variable numbers and their descriptions is given in Section 4.

The following examples were run interactively on a HARRIS 500 computer using a TEKTRONIX 4014 terminal and a macro called HGP to assign the files.

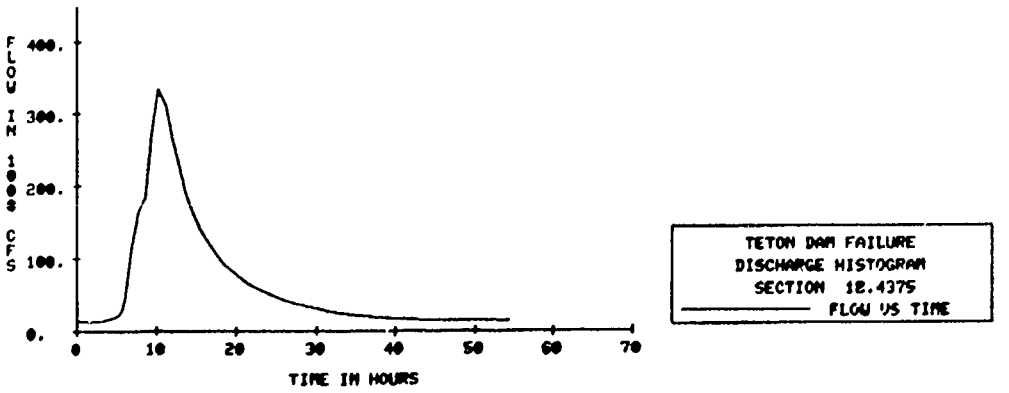
*NOTE: The DAMPOS program is presently under development and is not available to non-Corps users at the present time.

2. Example Plots Using the Variable vs. Variable Option (XSECPL).

```
HGP

 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)

V

    ***** VARIABLE vs VARIABLE PLOTTING MODULE *****

  ENTER TAPE95 FILE NAME  ???
TETON95
```

2.a Discharge Histogram at a Specific Location.

```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*CROSS-SECTION PLOTTING PROGRAM         *
*VERSION 1       JUNE   2, 1983         *
*****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
XLBL,TIME IN HOURS

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
YLBL,FLOW IN 1000 CFS

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,TETON DAM FAILURE

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
SLOC,DISCHARGE HISTOGRAM

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
DEFINE


EXISTING CURVE SPECS, TO ELIMINATE CURVE, ENTER "NULL" FOR SYMBOL + LINE O

CURVE   1     PLOTS DATA FOR*     GROU  ND P  ROFI  LE (  GR)
                XVAR=   0.,     YVAR=   0.,     SYMBOL= DEFA   , LINE= DEFA
 ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
1,6,3,,,,FLOW VS TIME

CURVE   2     PLOTS DATA FOR*     TOP   OF R  OAD   (BT)
                XVAR=   0.,     YVAR=   0.,     SYMBOL= DEFA   , LINE= DEFA
 ENTER   CURVE, XVAR, YVAR, SYMBOL, LINE, CHARACTER SIZE, VARDES**********
ALL

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```

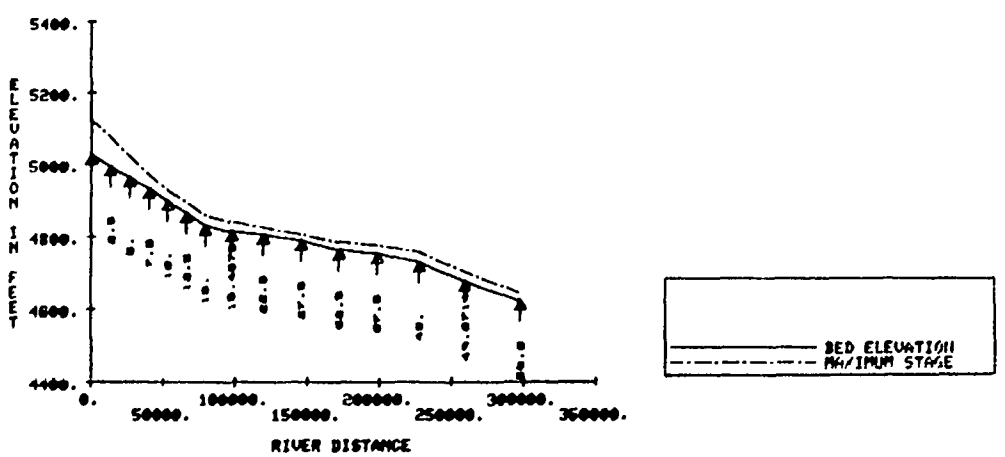


3. Example Plots Using the Profile Plotting Program (PROFPL).

```
HGP
 ENTER PROGRAM NAME BEING USED -- (P-PROFPL, X-XSECPL, V- VAR vs VAR)
P
*****PROFILE MODULE BEING EXECUTED*****
   ENTER FILE NAME FOR TAPE95 ???
TETON95
```

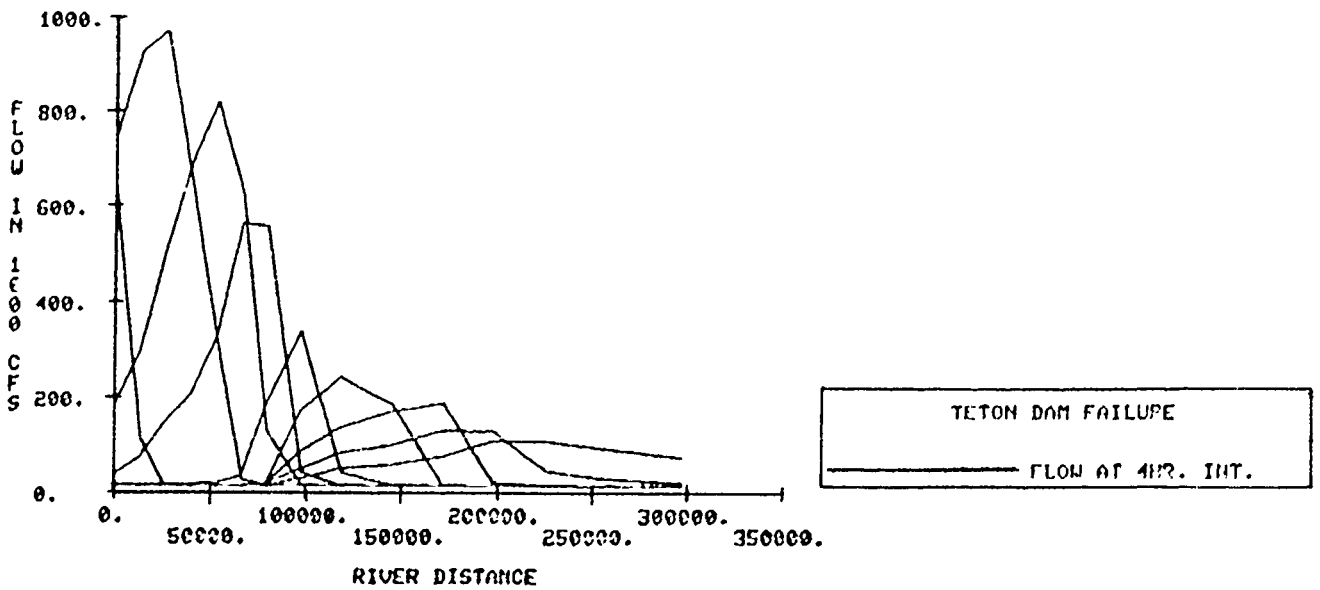
3.a Example Plot of Profile Plot of Maximum Stage Elevation vs River Distance.

```
ENTER THE NUMBER OF TIME PERIODS
 AND THE PERIODS A MAXIMUM OF 46 ALLOWED
1,1

*******************************************
*HYDRAULICS GRAPHICS PACKAGE              *
*PROFILE PLOTTING PROGRAM                 *
*VERSION 1        JUNE   2,1983           *
*******************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
YLBL,ELEVATION IN FEET

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GLBL,TETON DAM FAILURE

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
CURVE,1,VARDES,BED ELEVATION

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
CURVE,2,VARDES,MAXIMUM STAGE

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
GO
```



3b. Example of Profile Plot of Discharge vs. River Distance at 4 Hour Intervals.

```
 ENTER THE NUMBER OF TIME PERIODS
  AND THE PERIODS A MAXIMUM OF 46 ALLOWED
10,2,7,12,17,22,27,32,37,42,47

 ******************************************
 *HYDRAULICS GRAPHICS PACKAGE             *
 *PROFILE PLOTTING PROGRAM                *
 *VERSION 1       JUNE   2,1983           *
 ******************************************

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 YLBL,FLOW IN 1000 CFS

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 GLBL,TETON DAM FAILURE

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 DEFINE

 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                 REPETITIVE USER SPECIFYING ROUTINE

 ENTER THE FOLLOWING DATA  ;ENTER "ALL" TO TERMINATE INPUT


 CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
     1   5.   1.  NULL  LINE    0.07
 1,3,0,,,,FLOW AT 4HR. INT.

 CURVE  VAR  PRO  SYMB  FLINE CHSIZE     VARDES
     2   1.   1.  NULL  DASH    0.07
 ALL

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 SECNO,0

 ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
 GO
```



4. Table of DAMPOS-DAMBRK (TAPE95) Output Variables.

Profile No. 1

Code Number	Variable Name	Description
1	YM	Maximum water surface elevation reached in run.
2	DX	Distance between sections.
3	QMX	Maximum discharge.
4	PMAX( )	Maximum total width.
5	HS	Thalweg elevation.
6	DUMMY	Not used.
7	X	Section number.
8	PMAX ( )	Maximum wave heights.
9	PMAX( )	Maximum effective width.
10	PMAX( )	Maximum velocity.
11	PMAX( )	Maximum area.
12	PMAX( )	Maximum depth.
13	PMAX( )	Maximum Frcude number.
14	PMAX( )	Maximum composite n.
15	YMQ	Maximum discharge.
16	TM	Time of maximum elevation.
17	FLODH	Flooding elevation.
18	TFLODH	Time flooding charts.

Profile No. 2-N

Code Number	Variable Name	Description
1	YU	Computed water surface elevation.
2	DX	Distance between sections.
3	QU(I)	Computed discharge
4	BT	Total width.
5	HS	Thalweg elevation.
6	TT	Cumulative time.
7	X	Section number.
8	WAVEHT	Wave height.
9	B	Effective width.
10	V	Mean velocity.
11	A	Area.
12	DH	Hydraulic depth.
13	FED	Froude number.
14	CMM	Composite n value.
15 - 18	DUMMY	Not used.

Appendix VI

DEFAULT CURVE SETTINGS

APPENDIX VI

DEFAULT CURVE SETTINGS

Contents

1. Introduction

The following information was produced interactively by entering commands that list the available commands and their present settings for each of the two HGP programs HGPC and HGPP. The user can display this data by entering the "?", "??", "????" and "STATUS" Commands.

2. Command List and Default Settings

```
*****************************************
*HYDRAULICS GRAPHICS PACKAGE            *
*PROFILE PLOTTING PROGRAM               *
*VERSION 1       JUNE   2,1983          *
*************************************** ****

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

?

STRT        XUNIT       YUNIT       XAUPI       YAUPI
ELBASE      BRIDGE      SPEED       SECNUM      FRSTP
PRNT        TRACE       XLENBR      TITLBL      DESTIN
FACTOR      PLHT        GXMIN       GXMAX       GYMIN
GYMAX       XLAB        YLAB        AXES        DIVX
DIVY        HLSEC       HLGLB       HLLEGD      HLSLO
HLLSEC      HLXLB       HLXNUM      HLYLB       HLYNUM
IWINDO      XMIN        XPI         XMAX        YMIN
YPI         YMAX        CURVE       YVAR        PRO
SYMBOL      FLINE       CHSIZE      VARDES      GLBL
SLOC        XLBL        YLBL
ALL         GO          FINI        SPEC        BATC
INTE                                            STOP
?           ??          ???         ????        STAT
GCS         CALC        TEKT        TK4         C93
                        SCAL        DEFI

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

????


MODAL CHANGES WITHIN PROGRAM
EXIT COMMANDS
     ALL        EXIT REPETITIVE USER SEQUENCE
     GO         EXIT USER INPUT ROUTINE AND COMMENCE PLOTTING
     FINI       TERMINATE ALL PLOTTING
     STOP       PROGRAM STOP
SPECIFICATION COMMAND
     SPEC       EXIT GRAPHICS ROUTINE AND ENTER USER INPUT ROUTINE
OPERATIONAL ENVIRONMENT
     BATC       BATCH ENVIRONMENT - NO PAUSES NEEDED BETWEEN GRAPHS
     INTE       INTERACTIVE ENVIRONMENT, PAUSES NEEDED
HELP FROM PROGRAM OR CURRENT VARIABLE VALUES
     ?          LIST ALL AVAILABLE COMMANDS
     ??         LIST ALL COMMANDS AND THEIR SETTINGS
     ???        LIST COMMAND, SETTING, AND DEFENITION
     ????       LIST ALL COMMANDS, SETTINGS, AND DEFENITIONS
     STAT       LIST PROGRAM SETTINGS
TYPE OF SOFTWARE BEING USED
     GCS        THE GCS (GRAPHICS COMPATABILITY SYSTEM) SOFTWARE
     CALC       CALCOMP SOFTWARE
     TEKT       TEKTRONIX SOFTWARE (NOT OPERABLE)
DEVICES SUPPORTED BY PROGRAM
     TK4        TEKTRONIX 4014
     C93        CALCOMP DRUM
USER INPUT REPETITIVE ROUTINES
     SCAL       ENTER SCALING INFORMATION
     DEFI       ENTER PLOT VARIABLES AND SYMBOL/LINE OPTIONS
```

```
STRT                0.0000
        X VALUE ASSIGNED TO FIRST SECTION (CUM RIVER DISTANCE)
XUNIT       FT      ***********
        X DATA UNITS (FT,MI,M,KM, OR A FLOATING DENOMINATOR)
YUNIT       FT      ***********
        Y DATA UNITS (FT,MI,M,KM, OR A FLOATING DENOMINATOR)
XAUPI               0.0000
        X SCALE (UNITS-PER-DIVISION .DIVX.)
YAUPI               0.0000
        Y SCALE (UNITS-PER-DIVISION .DIVY.)
ELBASE              0.0000
        ELEVATION TO ADD TO ALL DATA
BRIDGE                 0.
        PLOT BRIDGE (BT) DATA (1-YES/ 0-NO)
SPEED                480.
        INTERACTIVE TERMINAL SPEED (30 IS 300 BAUD)
SECNUM                 2.
        CONTROLS SECTION LOC PLOT (0-NONE/ 1-ARROW/ 2-SEC NUMBER)
FRSTP                  1.
        FIRST OF NSC PLOTS, DONT PLOT FIRST PLOT
PRNT                   0.
        LEVEL OF NORMAL PRINTOUT
TRACE                  0.
        LEVEL OF TRACE PRINTOUT
XLENBR              2.1000
        DISTANCE (FT) GREATER THAN XLCH BETWEEN DOWNSTREMM NORM SEC
TITLBL                 2.
        ALPHANUMERIC LABELS (0-NONE/ 1-GLBL+SLOC/ 2-FULL LEGEND)
DESTIN      REMO
        CALCOMP PLOTTER LOCATION (LBL/CDC/REMO)
FACTOR              1.0000
        FACTOR TO MULTIPLY ALL CALCOMP PEN MOVEMENTS BY
PLHT               30.00
        HEIGHTH OF CALCOMP PLOTTER DRUM FOR STACKING PLOTS
GXMIN               0.000
        ORIGIN OF PHYSICAL PLOT SPACE OF X-AXIS (INCHES)
GXMAX              13.500
        MAXIMUM EXTENT OF X-AXIS FOR PLOTTING SPACE (INCHES)
GYMIN               0.000
        ORIGIN OF PHYSICAL PLOT SPACE OF Y-AXIS (INCHES)
GYMAX              10.500
        MAXIMUM EXTENT OF Y-AXIS FOR PLOTTING SPACE (INCHES)
XLAB                   3.
        GCS X-AXIS LABEL (1-NUMERIC/ 2-ALPHA/ 3-BOTH/ 4-NONE)
YLAB                   3.
        GCS Y-AXIS LABEL (1-NUMERIC/ 2-ALPHA/ 3-BOTH/ 4-NONE)
AXES                   2.
        GCS AXIS GRID (1-PLAIN/ 2-TICKED/ 3-GRID)
DIVX                  13.
        NUMBER OF DIVISIONS IN X-AXIS FOR SCALING PURPOSES
DIVY                  10.
        NUMBER OF DIVISIONS IN Y-AXIS FOR SCALING PURPOSES
HLSEC               1.000
        CROSS-SECTION LABEL LETTER SIZE (INCHES)
HLGLB               1.000
        GENERAL LABEL LETTER SIZE (INCHES)
HLLEGD              1.000
        CURVE LEGEND LABEL LETTER SIZE (INCHES)
HLSLO               1.000
        SPECIFIC LABEL LETTER SIZE (INCHES)
HLLSEC              1.000
        NOT OPERABLE
HLXLB               1.000
        X-AXIS ALPHANUMERIC LABEL LETTER SIZE
HLXNUM              1.000
        NOT OPERABLE
HLYLB               1.000

        Y-AXIS ALPHANUMERIC LABEL LETTER SIZE
```

```
HLYNUM              1.000
        NOT OPERABLE
IWINDO       IWINDO    1
        WINDOW OF PROFILE IS DESIRED, THIS IS THE INDEX NUMBER
XMIN         CURVE  1              0.000
        X-AXIS VIRTUAL WINDOW MINIMUM (USERS DATA UNITS)
XPI          CURVE  1           1000.000
        X-AXIS VIRTUAL UNITS PER DIVISION SCALE FOR ONE PLOT
XMAX         CURVE  1          13000.000
        X-AXIS VIRTUAL WINDOW MAXIMUM (USERS DATA UNITS)
YMIN         CURVE  1             20.000
        Y-AXIS VIRTUAL WINDOW MINIMUM (USERS DATA UNITS)
YPI          CURVE  1             10.000
        Y-AXIS VIRTUAL UNITS PER DIVISION SCALE FOR ONE PLOT
YMAX         CURVE  1            120.000
        Y-AXIS VIRTUAL WINDOW MAXIMUM (USERS DATA UNITS)
CURVE        CURVE  1
        INDEX OF VARIABLE AND CURVE SPECIFICATIONS
YVAR         CURVE  1              42.0000
        HEC2 VARIABLE TO PLOT (ELMIN/CWSEL/ETC. OR42/1/ ETC.)
PRO          CURVE  1                   1.
        PROFILE NUMBER TO PLOT
SYMBOL       CURVE  1         NULL     NULL
        LINE TERMINATOR(SYMBOL) FOR THIS CURVE (NULL/ARROW/POINT/
                                BACKARROW/DOUBLEARROW/CHARACTER/SYMBOL
                                C*/S1)
FLINE        CURVE  1         LINE              LINE
        LINE TYPE FOR THIS CURVE (NULL/LINE/DASH/TICK/ALPHA/D72/
                                T010020050/A*/)
CHSIZE       CURVE  1                1.000
        SIZE OF TERMINATOR(SYMBOL) FOR THIS CURVE (INCHES)
VARDES       CURVE  1         ELMI
        USER DESCRIPTION OF DATA BEING PLOTTED (FOR LEGEND)
GLBL
        GRAPH GENERAL LABEL
SLOC
        GRAPH SPECIFIC LABEL
XLBL
        X-AXIS ALPHANUMERIC LABEL
YLBL
        Y-AXIS ALPHANUMERIC LABEL
```

```
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
??

                                        CALCOMP


STRT                0.0000
XUNIT         FT      ************
YUNIT         FT      ************
XAUPI               0.0000
YAUPI               0.0000
ELBASE              0.0000
BRIDGE                 0.
SPEED                480.
SECNUM                 2.
FRSTP                  1.
PRNT                   0.
TRACE                  0.
XLENBR              2.1000
TITLBL                 2.
DESTIN        REMO
FACTOR              1.0000
PLHT          30.00
GXMIN                0.000              2.000
GXMAX               13.500              15.000
GYMIN                0.000              1.000
GYMAX               10.500              10.000
XLAB                   3.
YLAB                   3.
AXES                   2.
DIVX                  13.
DIVY                  10.              5.
HLSEC              1.000               .1
HLGLB              1.000               .1
HLLEGD             1.000               .1
HLSLO              1.000               .1
HLLSEC             1.000               .1
HLXLB              1.000               .1
HLXNUM             1.000               .1
HLYLB              1.000               .1
HLYNUM             1.000               .1
IWINDO        IWINDO    1
XMIN          CURVE  1            0.000
XPI           CURVE  1         1000.000
XMAX          CURVE  1        13000.000
YMIN          CURVE  1           20.000
YPI           CURVE  1           10.000
YMAX          CURVE  1          120.000
CURVE         CURVE  1
YVAR          CURVE  1              42.0000
PRO           CURVE  1                  1.
SYMBOL        CURVE  1        NULL     NULL
FLINE         CURVE  1        LINE                LINE
CHSIZE        CURVE  1                1.000
VARDES        CURVE  1        ELMI
GLBL
SLOC
XLBL
YLBL
```

```
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

STAT

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
USER FORMAT AND JOB CONTROL.....USER
USERS GRAPHICS DEVICE..........TK4
OPERATIONAL ENVIRONMENT.........INTE
GRAPHICS SOFTWARE..............GCS
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

      STRT      XUNIT      YUNIT      XAUPI      YAUPI     ELBASE     BRIDGE      SPEED     SECNUM
      0.00 FT     1.0 FT     1.0       0.00       0.00       0.00         0.        480.         2.
      PRNT      TRACE     XLENBR      TITLB     DESTIN     FACTOR       PLHT
        0.         0.       2.10         2.       REMO      1.000      30.00
     GXMIN      GXMAX      GYMIN      GYMAX       XLAB       YLAB       AXES       DIVX       DIVY
      0.00      13.50       0.00      10.50          3.         3.         2.        13.        10.

    HLLEGD      HLSEC
      1.00       1.00

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
GRAPH LABELS
NO. CHAR     LETR HT.     LABEL

GLBL  -1         1.0J
SLOC  -1         1.00
XLBL  -1         1.00
YLBL  -1         1.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
               REPETITIVE USER SPECIFYING ROUTINE

 ORDER HEC2 VAR PROFILE          SYMBOL                        LINE TYPE
     1  T42.       1.  NULL     @    @  LINE        @        1.000
ELMI
                          NULL        32.       32.  LINE      0.00       2.00       0.00
     2  @ 1.       1.  NULL     @    @  DASH      @    h      1.000
CWSE
                          NULL        32.       32.  DASH      1.00      52.00       0.00
     3  @ 1.       2.  NULL     @    @  DASH      @    N      1.000
CWSE
                        .           .         .          .          .          .
                        .           .         .          .          .          .
                        .           .         .          .          .          .
                        .           .         .          .          .          .
                        .           .         .          .          .          .

    46  @ 1.      45.  NULL     @    @  DASH      H    X        1.000
CWSE
                          NULL        32.       32.  DASH      9.00 721612.00       0.00
 SPECIFIC SCALES ENTERED FOR     1     CURVES
 CURVE      XMIN        XPI        XMAX        YMIN        YPI        YMAX
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
     1     0.000   1000.000  13000.000     20.000     10.000    120.000
```

3. HGPP Command List and Default Settings

```
****************************************
*HYDRAULICS GRAPHICS PACKAGE           *
*CROSS-SECTION PLOTTING PROGRAM        *
*VERSION 1       JUNE   2, 1983        *
****************************************

ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

?

XAUPI      YAUPI      PLBRIDGE   STAB       STAE
ELBASE     BRIDGE     SPEED      PRNT       TRACE
TITLBL     DESTIN     OUTFRM     FACTOR     PLHT
GXMIN      GXMAX      GYMIN      GYMAX      XLAB
YLAB       AXES       DIVX       DIVY       HLCOM
HLGLB      HLLEGD     HLSLOC     HLSEC      HLXLB
HLXNUM     HLYLB      HLYNUM     SSEC       XMIN
XPI        XMAX       YMIN       YPI        YMAX
CURVE      XVAR       YVAR       SYMBOL     FLINE
CHSIZE     VARDES     GLBL       SLOC       XLBL
YLBL       SECTION    IHNQ       INQ        IBW
ALL        GO         FINI       SPEC       BATC
INTE                                         STOP
?          ??         ???        ????       STAT
GCS        CALC       TEKT       TK4        C93
                      SCAL       DEFI


ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

????


MODAL CHANGES WITHIN PROGRAM
EXIT COMMANDS
     ALL       EXIT REPETITIVE USER SEQUENCE
     GO        EXIT USER INPUT ROUTINE AND COMMENCE PLOTTING
     FINI      TERMINATE ALL PLOTTING
     STOP      PROGRAM STOP
 PECIFICATION COMMAND
     SPEC      EXIT GRAPHICS ROUTINE AND ENTER USER INPUT ROUTINE
OPERATIONAL ENVIRONMENT
     BATC      BATCH ENVIRONMENT - NO PAUSES NEEDED BETWEEN GRAPHS
     INTE      INTERACTIVE ENVIRONMENT, PAUSES NEEDED
HELP FROM PROGRAM OR CURRENT VARIABLE VALUES
     ?         LIST ALL AVAILABLE COMMANDS
     ??        LIST ALL COMMANDS AND THEIR SETTINGS
     ???       LIST COMMAND, SETTING, AND DEFENITION
     ????      LIST ALL COMMANDS, SETTINGS, AND DEFENITIONS
     STAT      LIST PROGRAM SETTINGS
TYPE OF SOFTWARE BEING USED
     GCS       THE GCS (GRAPHICS COMPATABILITY SYSTEM) SOFTWARE
     CALC      CALCOMP SOFTWARE
     TEKT      TEKTRONIX SOFTWARE (NOT OPERABLE)
DEVICES SUPPORTED BY PROGRAM
     TK4       TEKTRONIX 4014
     C93       CALCOMP DRUM
USER INPUT REPETITIVE ROUTINES
     SCAL      ENTER SCALING INFORMATION
     DEFI      ENTER PLOT VARIABLES AND SYMBOL/LINE OPTIONS
     SECP      ENTER CERTAIN SECTIONS TO PLOT
```

```
XAUPI              0.0000
        X SCALE (UNITS-PER-DIVISION .DIVX.)
YAUPI              0.0000
        Y SCALE (UNITS-PER-DIVISION .DIVY.)
PLBRIDGE              0.
        PLOT BRIDGE AND INEFFECTIVE AREA SECTIONS ONLY
         (0-ALL SECTIONS 1-BRIDGES ONLY 2-BRIDGES AND INEFF. AREA
STAB          -999999.0000
        FIRST OF SEVERAL CONSECUTIVE SECTIONS TO PLOT (SECNO)
STAE           999999.0000
        LAST OFF SEVERAL CONSECUTIVE SECTIONS TO PLOT (SECNO)
ELBASE             0.0000
        ELEVATION TO ADD TO ALL DATA
BRIDGE                1.
        PLOT BRIDGE (BT) DATA (1-YES/ 0-NO)
SPEED                480.
        INTERACTIVE TERMINAL SPEED (30 IS 300 BAUD)
PRNT                  0.
        LEVEL OF NORMAL PRINTOUT
TRACE                 0.
        LEVEL OF TRACE PRINTOUT
TITLBL                2.
        ALPHANUMERIC LABELS (0-NONE/ 1-GLBL+SLOC/ 2-FULL LEGEND)
DESTIN          REMO
        CALCOMP PLOTTER LOCATION (LBL/CDC/REMO)
OUTFRM          NOWS
        WATER SURFACE CONTROL (WS-PLOT CWSEL/  NOWS-DO NOT PLOT CWSEL)
FACTOR            1.000
        FACTOR TO MULTIPLY ALL CALCOMP PEN MOVEMENTS BY
PLHT             30.00
        HEIGHTH OF CALCOMP PLOTTER DRUM FOR STACKING PLOTS
GXMIN             0.000
        ORIGIN OF PHYSICAL PLOT SPACE OF X-AXIS (INCHES)
GXMAX            10.500
        MAXIMUM EXTENT OF X-AXIS FOR PLOTTING SPACE (INCHES)
GYMIN             0.000
        ORIGIN OF PHYSICAL PLOT SPACE OF Y-AXIS (INCHES)
GYMAX            10.500
        MAXIMUM EXTENT OF Y-AXIS FOR PLOTTING SPACE (INCHES)
XLAB                  3.
        GCS X-AXIS LABEL (1-NUMERIC/ 2-ALPHA/ 3-BOTH/ 4-NONE)
YLAB                  3.
        GCS Y-AXIS LABEL (1-NUMERIC/ 2-ALPHA/ 3-BOTH/ 4-NONE)
AXES                  2.
        GCS AXIS GRID (1-PLAIN/ 2-TICKED/ 3-GRID)
DIVX                 10.
        NUMBER OF DIVISIONS IN X-AXIS FOR SCALING PURPOSES
DIVY                 10.
        NUMBER OF DIVISIONS IN Y-AXIS FOR SCALING PURPOSES
HLCOM             1.000
        COMMENT CARD LABEL LETTER SIZE (INCHES)
HLGLB             1.000
        GENERAL LABEL LETTER SIZE (INCHES)
HLLEGD            1.000
        CURVE LEGEND LABEL LETTER SIZE (INCHES)
HLSLOC            1.000
        SPECIFIC LABEL LETTER SIZE (INCHES)
HLSEC             1.000
        SECTION NUMBER LABEL LETTER SIZE (INCHES)
HLXLB             1.000
        X-AXIS ALPHANUMERIC LABEL LETTER SIZE
HLXNUM            1.000
        NOT OPERABLE
HLYLB             1.000
        Y-AXIS ALPHANUMERIC LABEL LETTER SIZE
HLYNUM            1.000
        NOT OPERABLE
SSEC            NSC    1

        SPECIFIC SCALES ARE REQUIRED FOR SOME SECTIONS BELOW)
```

```
XMIN          CURVE  1              0.000
        X-AXIS VIRTUAL WINDOW MINIMUM (USERS DATA UNITS)
XPI           CURVE  1              0.000
        X-AXIS VIRTUAL UNITS PER DIVISION SCALE FOR ONE PLOT
XMAX          CURVE  1              0.000
        X-AXIS VIRTUAL WINDOW MAXIMUM (USERS DATA UNITS)
YMIN          CURVE  1              0.000
        Y-AXIS VIRTUAL WINDOW MINIMUM (USERS DATA UNITS)
YPI           CURVE  1              0.000
        Y-AXIS VIRTUAL UNITS PER DIVISION SCALE FOR ONE PLOT
YMAX          CURVE  1              0.000
        Y-AXIS VIRTUAL WINDOW MAXIMUM (USERS DATA UNITS)
CURVE                1
        INDEX OF CURVES FOR SPECIFYING VARIABLES,SYMBOLS,ETC.
XVAR          CURVE  1                0.
        X VARIABLE TO USE IN POST-PROCESSING TAPE95 OUTPUT
YVAR          CURVE  1                0.
        Y VARIABLE TO USE IN POST-PROCESSING TAPE95 OUTPUT
SYMBOL        CURVE  1     DEFA       NULL
        LINE TERMINATOR(SYMBOL) FOR THIS CURVE (NULL/ARROW/POINT/
                                BACKARROW/DOUBLEARROW/CHARACTER/SYMBOL
                                C*/S1)
FLINE         CURVE  1     DEFA        LINE
        LINE TYPE FOR THIS CURVE (NULL/LINE/DASH/TICK/ALPHA/D72/
                                T010020050/A*/)
CHSIZE        CURVE  1                1.
        SIZE OF TERMINATOR(SYMBOL) FOR THIS CURVE (INCHES)
VARDES        CURVE  1     GROUND PROFILE (GR)
        DESCRIPTION OF CURVE - USED IN LEGEND BLOCK
GLBL          UTH LEVEE      (JR)       W LIMIT
        GRAPH GENERAL LABEL
SLOC                N     U     L
        GRAPH SPECIFIC LABEL
XLBL                N     U     L
        X-AXIS ALPHANUMERIC LABEL
YLBL                N     U     L
        Y-AXIS ALPHANUMERIC LABEL
SECTION       NSEC   0
        SPECIFIC SECTIONS WILL BE PLOTTED (SHOWN IN LIST)
IHNQ            0
        HISTOGRAM Q CARD FIELD NUMBER
INQ             2
        PROFILE QT CARD FIELD NUMBER
IBW             6
        BOTTOM WIDTH CI CARD FIELD NUMBER
```

```
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

STAT

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
USER FORMAT AND JOB CONTROL.....USER
USERS GRAPHICS DEVICE..........TK4
OPERATIONAL ENVIRONMENT.........INTE
GRAPHICS SOFTWARE..............GCS
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

     XAUPI      YAUPI     PLCHCN       STAB       STAE     ELBASE     BRIDGE      SPEED
      0.00       0.00        0.-999999.0  999999.000      0.000         1.       480.

      PRNT      TRACE      TITLB     DESTIN     OUTFRM     FACTOR       PLHT
        0.         0.         2.     REMO       NOWS         1.00      30.00

     GXMIN      GXMAX      GYMIN      GYMAX       XLAB       YLAB       AXES       DIVX       DIVY
      0.00      10.50       0.00      10.50         3.         3.         2.        10.        10.

     HLCOM      HLSEC     HLLEGD
      1.00       1.00       1.00

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
GRAPH LABELS
NO. CHAR      LETR HT.      LABEL

GLBL  -1          1.00      UTH LEVEE      (JR)       W LIMIT
SLOC  -1          1.00            N      U      L
XLBL  -1          1.00            N      U      L
YLBL  -1          1.00            N      U      L
T3L   24          1.00      TEST 16 SPLIT FLOW PROBL D BRIDGE


COMMENT CARD DATA ENTERED FOR   3  SECTIONS USING A LETTER HEIGHTH OF- 1.00
    SECTION      LABEL

      0.000      SOUTHERN PACIFIC RAIL ROAD BRIDGE


* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                    DATA CURVE OPTIONS
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
  CURVE OPTION  PLOOPT    SYMBOL CHARACTER     OPLN1     OPLN2     OPLN3 XVAR YVAR CSIZE
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

      1   201.  LNUL         X          X                    0.    0.  1.00
GROUND PROFILE (GR)
                  ********************       0.00      0.00      0.00
      2   301.  DNUL                          @   h        0.    0.  1.00
TOP OF ROAD (BT)  )
                  ********************       1.00     52.00      0.00
      3   301.  DNUL                          @   Qp
LOW CHORD (BT)    )
                  ********************       2.00   5212.00      0.00
      4   301.  DNUL                          H            0.    0.  1.00
FINAL GEOMETRY    )
                  ********************       9.00     12.00      0.00
      5   106.  NCHA         L          L                   0.    0.  2.00
LEFT BANK (X1)    )
                  ********************       0.00      0.00      0.00
      6   106.  NCHA         R          R                   0.    0.  2.00
RIGHT BANK (X1)   )
                  ********************       0.00      0.00      0.00
      7   301.  DNUL                          H            0.    0.  1.00
LOW FLOW TRAPEZOID (SB)
```

```
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING

??

                                                    CALCOMP

XAUPI                    0.0000
YAUPI                    0.0000
PLBRIDGE                    0.
STAB                -999999.0000
STAE                 999999.0000
ELBASE                   0.0000
BRIDGE                      1.
SPEED                     480.
PRNT                        0.
TRACE                       0.
TITLBL                      2.
DESTIN              REMO
OUTFRM              NOWS
FACTOR                   1.000
PLHT                30.00
GXMIN                    0.000                      1.000
GXMAX                   10.500                      11.000
GYMIN                    0.000                      1.000
GYMAX                   10.500                      8.000
XLAB                        3.
YLAB                        3.
AXES                        2.
DIVX                       10.
DIVY                       10.
HLCOM                    1.000                      .100
HLGLB                    1.000                      .100
HLLEGD                   1.000                      .100
HLSLOC                   1.000                      .100
HLSEC                    1.000                      .100
HLXLB                    1.000                      .100
HLXNUM                   1.000                      .100
HLYLB                    1.000                      .100
HLYNUM                   1.000                      .100
SSEC                NSC     1
        SPECIFIC SCALES ARE REQUIRED FOR SOME SECTIONS BELOW)
XMIN                CURVE   1                   0.000
XPI                 CURVE   1                   0.000
XMAX                CURVE   1                   0.000
YMIN                CURVE   1                   0.000
YPI                 CURVE   1                   0.000
YMAX                CURVE   1                   0.000
CURVE                               1
XVAR                CURVE    1                      0.
YVAR                CURVE    1                      0.
SYMBOL              CURVE    1          DEFA        NULL
FLINE               CURVE    1          DEFA          LINE
CHSIZE              CURVE    1                      1.
VARDES              CURVE    1          GROUND PROFILE (GR)
GLBL                UTH LEVEE           (JR)        W LIMIT
SLOC                      N       U       L
XLBL                      N       U       L
YLBL                      N       U       L
SECTION             NSEC     0
IHNQ                  0
INQ                   2
IBW                   6
```

```
                               ********************     9.00     12.00      0.00
    8   206.  LCHA              W          W              fff33½     fff33    0.    0.   1.00
WEIR FLOW THRESHOLD (SB)
                               ********************     0.00      0.05      0.10
    9   206.  LCHA              P          P          fff33½           fff33    0.    0.   1.00
PRESSURE FLOW THRESHOLD
                               ********************     0.05     12.00      0.10
   10   201.  LNUL                                            fff33½   0.    0.  1.00
DISCHARGE HISTOGRAM
                               ********************     0.00      0.00      0.05
   11   201.  LNUL                                            fff33½   0.    0.  1.00
SPLIT FLOW DATA   M
                               ********************     0.00      0.00      0.05
   12   301.  DNUL                                    @    D      fff33½   0.    0.   1.00
ICE OPTION  (IC)  M
                               ********************     2.00     34.00      0.05
   13   203.  LARR                                       X     LLLff    0.    0.  1.00
LEFT BANK EFFECTIVE FLOW
                               ********************     0.00     11.00      0.15
   14   203.  LARR                                       X     LLLff    0.    0.  1.00
RIGHT BANK EFFECTIVE FLO
                               ********************     0.00     11.00      0.15
   15   201.  LNUL                                              0.   0.   1.00
RATING CURVE  (JR)
                               ********************     0.00      0.00      0.00
ENTER: VARIABLE/SEPARATOR/VALUE OR STRING
STOP
```

Appendix VII

PREAD

Appendix VII

PREAD

Table of Contents

1. Introduction

The following deals with the PREAD routine that has been incorporated into the HGP program. At the present time only the Harris 500 Computer version of the HGP program has this capability. The PREAD routine will only be made available to Corps users.

The incorporation of the routine PREAD in an interactive program can greatly enhance its friendliness to the user. PREAD allows a program to conveniently take input form the keyboard as would normally occur in an interactive environment, but also allows several input alternatives.

Input alternatives available to any program using PREAD are:

1) Function references
2) Macro procedures

Function references and macro procedures may be utilized by interactive users at any kind of terminal.

2. Function References

The function capability allows any legal character to be redefined to mean a string of one or more legal characters. For example, the slash (/) could be redefined to be a comma (,). The dollar sign ($) could be redefined to be the string "DEFINE" or the pound sign (#) could be redefined to be the string "YLBL,DISCHARGE IN CFS." If the function mode is turned on, then each use of the "/", "$" or "#" would produce the redefined equivalent.

The function capability can be a significant asset for frequently typed strings entered at the keyboard. Function references can also be nested, so that one function reference may in turn reference other functions. Functions may also be referenced by input lines from macros or menus as discussed later. Function definitions are preserved in the function file.

3. Macro Procedures

Macro procedures are sets of reoccurring lines of input. If, for example, an interactive program requires 5 or 6 lines of input to create a certain plot that one frequently looks at, the 5 or 6 lines could be stored in a macro. When the plot is desired, one need only run the macro to produce the plot. The execution of a macro can make using an interactive program considerably more pleasant for repetitive uses. Lines stored in the macro may in turn contain function references. Thus, for example, a macro with a function reference may produce 2 different plots if the function reference is redefined between its executions. Macros may also be nested. Macro definitions are preserved in the macro file.

4. Support Capabilities

Each of the above capabilities is controlled by a separate file that describes the functions and macros available to the user. These files are normal text files that can be edited by the user to change the function definitions or macro procedures. The format of each of these files is given in Exhibits A and B of this appendix.

The user may define or redefine functions directly without the need to edit the appropriate text file. Similarly the user may have PREAD create a macro as the steps are executed by the program. Optionally, commands may be echoed to the user terminal as they are executed. this can be helpful when function

references are used as input or lines are retrieved from a macro file. PREAD will also keep a log of all lines entered at the terminal, run from a macro, or selected from a menu. This feature can help reconstruct critical terminal sequences, if necessary. Input lines are stored in the log file.

5. Extended Capabilities

The following material discusses extended capabilities which are not necessarily available to all users of programs containing PREAD. Extended capabilities require special implementation for each computer system used. The user may interrupt the execution of the program at any program input location and begin execution of any other program. When the user has completed execution of the second program, he may then return to the first program and continue execution where the interruption first occurred.

The user may move into job control at any point in the execution of a program and resume execution when JCL activities are complete. Under the current version, caution must be exercised while in job control not to destroy files needed to resume execution of the interrupted program.

6. PREAD Commands

All lines that contain the command character, an exclamation sign (!), in the first character position of a line are assumed to be commands to PREAD.

A minus sign (-) following the command character and preceding the command character verb will cause appropriate commands to take on their opposite meaning.

An equal sign (=) following the command character and preceding the command verb will cause appropriate commands to display current definitions.

Commands may be abbreviated to one or more characters. If non-unique abbreviations are used, unpredictable results may occur.

FUNCTION COMMAND

Turns on or turns off function mode (default is on). If function mode is off, a function reference may be forced by preceding the function reference with the function shift character. The default function shift character is up-arrow (↑). The function shift character is defined in the function file and may be changed there by a text editor.

EXAMPLES:

```
!FUNCTION       Turn function mode on.
!-FUNCTION      Turn function mode off.
!=FUNCTION      Display all defined functions.
```

****

TEACH COMMAND

Defines, re-defines or removes a function character. When re-defining or removing a function character definition, be sure function mode is off.

EXAMPLES:

```
!TEACH @ 12 AB      Define at sign @ to mean 12 AB.
!-TEACH #           Remove pound sign # from function use.
```

****

RUN COMMAND

Executes a macro. Macros may be interrupted and resumed. Macros are interrupted by embedding a -RUN command within the macro. Names of all macros defined may be displayed.

EXAMPLES:

```
!RUN ONE        Execute macro named ONE.
!-RUN           Interrupt macro execution.  Current macro remains defined.
!RUN            Resume interrupted macro.
!=RUN           Display names of all defined macros.
!=RUN TWO       Display steps in macro TWO.
```

****

LEARN COMMAND

Creates a macro by learning (remembering) a series of entries made by the user.

EXAMPLE:

```
!LEARN ABE      Begin saving lines in macro ABC.  All subsequent input
                lines will be included in macro ABC.
!-LEARN         End saving lines in current macro.
```

ECHO COMMAND

Controls the display of lines to the users terminal.

EXAMPLE:

```
    !ECHO          Turn echo mode on.  All lines displayed (default).
    !-ECHO         Turn echo mode off.
```

****

LOG COMMAND

Controls the logging of input lines to the log file.

EXAMPLE:

```
    !LOG           Turn log mode on  (default).
    !-LOG          Turn log mode off.
```

****

KEYBOARD COMMAND

Causes input to revert to the keyboard. Performs equivalent of both -RUN and -MENU commands.

EXAMPLE:

```
    !KEYBOARD      Obtain input from keyboard.
```

****

HARDCOPY COMMAND

Causes a hardcopy to be made of the CRT screen. Currently implemented for TEK 4014 only.

EXAMPLE:

```
    !HARDCOPY      Generate hardcopy of CRT screen.
```

****

CHAIN COMMAND

Interrupts execution of current program and initiates execution of requested program. Upon termination of second program, execution of original program will resume where interrupted.

EXAMPLE:

```
    !CHAIN XXX     Chain into program XXX.
```

JCL COMMAND

Interrupts execution of current program and initiate system job control. Enter EXIT to resume execution of interrupted program. If another application program is executed while in job control, at termination of the application program the interrupted program will resume execution.

EXAMPLE:

```
!JCL            Move into system JCL.
                (Use EXIT to resume execution)
```

****

COED COMMAND

Interrupts execution of current program and execute COED editing requested file.

EXAMPLE:

```
!COED AAA       Edit file AAA with COED.
```

****

? COMMAND

Displays the PREAD commands available to the user.

EXAMPLE:

```
!?
```

****

STATUS COMMAND

Displays the state of PREAD flags and the command and function characters.

EXAMPLE:

```
!STATUS
```

EXHIBIT A - FUNCTION FILE

The function file contains the definition of the function shift character and each function character that has been defined. It is a normal text file in the following format.

Line 1 - the first character of line 1 is the function shift character. The recommended character is the up arrow. The line is read as an A1 format.

The remaining entries occur in pairs of lines. The first line of the pair contains the character which is to be treated as a function and a numeric integer count (NCHAR) of how many characters of the next line are included in the function reference. This line is read in free format. The second line of the pair contains the string of one or more characters (NCHAR) that is the function reference value. If NCHAR is omitted, it is calculated to be the column number of the last non-blank character in the following line.

Two lines are used for each function to be defined.

Sample Function File

```
#    3
ABC
$    33
GXMIN,1,GXMAX,20,GYMIN,1,GYMAX,10
%    4
XX
```

Note: The % character is defined as a 4-character string ending with 2 blanks.

EXHIBIT B - MACRO FILE

The macro file contains information about the PREAD command character, the initial bootstrap macro and the definition of each macro.

An optional entry to redefine the PREAD command character from its internal default of exclamation point (!) to another character may be entered as the first line of the macro file. If used, it must be the first line in the file. It contains CC in Col 1-2, a space in Col 3 and the PREAD command character in Col 4.

A second optional entry to define a BOOTSTRAP macro may be entered at the beginning of the macro file. If used it must immediately follow the CC line, or if no CC line is used, it must be the first line of the file. The characters BOOTSTRAP must appear beginning in Col 1. If present, the line immediately following BOOTSTRAP will be taken as a command line to PREAD and be executed by PREAD. Most typically this line would be a RUN command, such as "!RUN BEGIN". Thus macro BEGIN would be executed. It may contain several other commands to load a menu, teach a special function reference, or transmit initial input lines to the program.

The remaining lines of the macro file are macro definitions. Each definition begins with the line MACRO NAME where MACRO must begin in Col 1 and the 1- to 8-character name must begin in Col 7. Subsequent lines are lines to be executed when the macro is run. The macro definition is terminated by an ENDMACRO line beginning in Col 1.

Sample Macro File with Bootstrap

```
BOOTSTRAP
!RUN BEGIN
MACRO BEGIN
!-ECHO
CALCOMP
$
ENDMACRO
MACRO ABC
DEFINE
1,4,1,NULL,LINE,,TOP WIDTH OF FLOOD
ENDMACRO
```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